International practice in care provision for post stroke visual impairment

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Purpose: This study sought to explore the practice of orthoptists internationally in care provision for post stroke visual impairment.

Methods: Survey questions were developed and piloted with clinicians, academics and users. Questions addressed types of visual problems, how these were identified, treated and followed up, care pathways in use, links with other professions and referral options. The survey was approved by the Institutional ethical committee. The survey was accessed via a web-link which was circulated through the International Orthoptic Association member professional organisations to orthoptists.

Results: 299 completed electronic surveys were obtained. About one third (35.5%) of orthoptists saw patients within two weeks of stroke onset and over half (55.5%) by one month post stroke. 87% routinely assessed stroke survivors; over three quarters in eye clinics. 11% used screening tools. Validated tests were used for assessment of visual acuity (76.5%), visual field (68.2%), eye movement (80.9%), binocular vision (77.9%) and visual function (55.8%). Visual problems suspected by family or professionals were high (86.6%). Typical overall follow-up period of vision care was less than 3 months. 56.9% of orthoptists used designated care pathways for stroke survivors with visual problems. 85.9% of orthoptists provided information on visual impairment.

Conclusions: In international orthoptic practice, there is general agreement on assessment and management of visual impairment in stroke populations. More than half of orthoptists reported seeing stroke survivors within one month of the stroke onset, typically in eye clinics. There was a high use of validated tests of visual acuity, visual fields, ocular motility and binocular vision. Similarly there was high use of established treatment options including prisms, occlusion, compensatory strategies and oculomotor training, appropriately targeted at specific types of visual conditions/symptoms. This information can be used to inform choice of core outcome orthoptic measures in stroke practice.

Keywords: Visual impairment; Stroke; Survey; Screening; Assessment; Management; Information

Introduction

Post-stroke visual impairment is common affecting approximately two thirds of stroke survivors (1). Abnormalities include central and/or peripheral vision loss, eye movements and a variety of visual perception problems such as inattention and agnosia. The visual impairment can be complex including ocular as well as cortical damage (2). Visual symptoms can be wide ranging including blurred vision, hallucinations, diplopia and reading impairment (3). A UK-based survey of eye and stroke team professionals showed a wide variation in clinical practice for the screening, assessment and management of visual impairment associated with stroke (4). This survey explored the features of high quality service in established stroke/vision services and highlighted a variety of practical elements to improve care provision. The survey followed on from previous work showing a post-code lottery in the UK for stroke-specific vision services. One UK survey reported only 45% of hospitals with stroke/vision services whilst a further survey of stroke units highlighted limited use of referral pathways for stroke survivors with visual impairment (5,6). Issues with care provision for stroke survivors with visual impairment exist in other countries. For example, the need to improve such services has been reported in Australia (7).

Involvement of Orthoptists at earlier stages in the stroke pathway is acknowledged as a requirement; the current UK Royal College of Physicians national clinical guidelines for stroke recommend Orthoptists as a member of the core multi-disciplinary stroke unit team (8).

The recent UK-based Orthoptic survey provided important information on which to base future work to improve eye care services for stroke survivors (4). However there are important lessons to learn from international practice. Therefore the purpose of this study was to consider the practice of orthoptists internationally in care provision for post stroke visual impairment though an international survey.

Materials and methods

Institutional ethical approval was obtained for this study and the study adhered to the tenets of the Declaration of Helsinki. The survey of orthoptists included the following stages.

Methodology and feasibility

Development of survey questions involved consultation and pilot testing with clinicians, academics and users identified through professional organisation stroke specialist interest groups and stroke user forums in the UK. A range of questions addressed the types of visual problems seen, how these were identified, how these were treated, followed-up, what care pathways were used, links with other professions, referral options and provision of /access to resources.

Instruments

The online survey consisted of 30 questions (appendix 1) containing a mix of closed and open questions with additional sections for inserting comments. The survey took approximately 18 minutes to complete but could only be completed in one session, i.e. it was not possible to pause, save the survey and return to complete it at a later time.

Sample

Our sample included orthoptists contacted via their International Orthoptic Association (IOA) professional representatives;

(http://www.internationalorthoptics.org/international-contacts.html).

Conduct

The survey was available for completion via a web-link which was circulated, along with a cover letter outlining the purpose of the survey. The survey was emailed to all member and affiliate professional orthoptic representatives and remained open for completion over a 3-month period (June-August 2014). Polite reminder emails were subsequently circulated to boost survey completion rates.

Consent to participate in the survey was implied by completion of the survey. The first page of the survey provided study-specific background information to inform participants of the purpose of the study.

The information provided on the returned surveys was input to a database (SPSS version 22: IBM, USA) and descriptive analysis undertaken to combine responses in relation to each of the questions.

Results

Respondent demographics

Completed surveys were obtained from 299 individuals. A further 165 individuals started the survey but dropped out before completion; although this figure will include some people who returned to the questionnaire and completed it as a new survey at a later date. Orthoptists represented 16 countries with the greatest number (63.2%) from the UK (figure 1). In view of the disproportionate number of responses from the UK, responses from the UK respondents were compared to non-UK respondents to explore whether responses in different categories of questions were skewed. Comparisons were not found to be skewed (Kruskal-Wallis test) and therefore all responses were pooled for analysis.

Visual screening and/or assessment

Patients were seen within variable time periods but many orthoptists (35.5%) saw patients within two weeks of admission (table 1) and 55.5% saw patients within one month.

Many orthoptists reported assessing their patients on a stroke unit (31.1%) with 13.4% seen on neurological, general or elderly care wards. Most orthoptists saw patients in the eye clinic (78.6%), at home (2%) or in rehabilitation units (13.7%).

The majority of orthoptists (87%) reported routinely assessing stroke survivors. Thirteen percent of orthoptists did not personally test stroke survivors and 9% had a visiting orthoptist to assess stroke survivors.

Screening tools were used by 10.7%. A range of well-recognised and validated vision tests (table 2) were used by orthoptists for assessment of visual acuity (76.5%), visual field (68.2%), eye movement (80.9%), binocular vision (77.9%) and visual function (55.8%).

When testing visual acuity, logMAR and Snellen charts were more frequently used (48.2% and 54.5% respectively). For assessment of ocular alignment, the cover test was most frequently used (92.6%) along with observations of corneal reflections (27%). Assessment of binocular function commonly included stereopsis (30%) and fusional ability (25%). Visual fields were assessed with confrontation (52.2%), static perimetry (44.1%) or kinetic perimetry (37.4%). Functional assessments of vision (such as observation of patient's detection of objects in their surroundings or their ability to identify obstacles when walking) were undertaken by 58.5% of orthoptists. Eleven percent of orthoptists reported using questionnaires.

Visual symptoms and conditions

We asked orthoptists to report whether they encountered various symptoms frequently, sometimes, rarely, never or did not know about the symptoms. Orthoptists reported recognising a variety of visual symptoms. Table 3 shows the frequency of recognition of

these visual symptoms. Symptoms recognised frequently included reading difficulty (58.2%), visual field change (41.8%), changed or altered vision (44.8%), Blurred vision (44.5%), diplopia (29.8%), depth perception impairment (23.7%) and clumsiness/increased collisions (36.1%). In addition, we asked whether visual problems were observed or suspected by family or other professionals. The response to this question was high at 86.6%.

A range of stroke-related visual conditions were recognised by orthoptists as underlying their patients' visual symptoms (table 4). Visual conditions recognised frequently included visual field loss (58.5%), visual inattention (30.4%), strabismus (33.1%), cranial nerve palsy (37.5%), gaze palsy (23%), eye tracking problems (26.7%) and reduced visual acuity (43.5%). Most visual conditions were sometimes recognised by many orthoptists apart from pupil, contrast sensitivity and colour defects plus visual perceptual issues (e.g. hallucinations and agnosia).

Visual rehabilitation and referrals

Visual rehabilitation options included treatment to improve visual acuity, to improve adaptation to visual field loss, to alleviate diplopia and improve eye movements, and to improve reading and functional vision (table 5). The most commonly provided treatment options included vision advice (89.9%), functional advice (55.9%), reading strategies (65.9%), prisms for diplopia (93.6%), monocular patch (89.9%) and refraction (70.9%).

If patients had no visual symptoms but had an eye condition, 11% stated they would always treat, 65.2% would sometimes treat and 14.4% would not treat. Of those who would treat, the typical reasons given for this decision were to improve quality of life, reduce bumping and tripping, and in the presence of visual neglect.

The usual overall follow-up period was less than 3 months. This varied depending on whether the visual condition related to visual field loss, eye movement disorders, reduced visual acuity or visual perception impairment (figure 2).

Care pathways, resources and knowledge base

A designated care pathway for stroke survivors with visual problems was used by 56.9% of orthoptists. Visual information sheets related to patient's visual problems were provided for patients by 85.9% of orthoptists. Information was also provided about stroke (34.1%), needs at home (38.1%) and driving (18.4%). Orthoptists reported their use of signposting to additional medical and social services (48.8%).

Discussion

The purpose of this study was to gather information from international orthoptists regarding their practice in the care of stroke survivors. We received 299 responses to our survey from a circulation of the online survey through the IOA. This is a reasonable number of survey responses. However, our results are limited by a lower than anticipated response rate and a high non-completion rate (discussed later). Nearly two thirds of responses were from UK orthoptists with the remainder spread across 15 other countries as outlined in figure 1. A comparison across country responses was made to ascertain if the UK responses were considerably different to others with the potential to skew results. We found no such difference. Indeed responses were remarkably similar across contries showing consistency in Orthoptist practice internationally in stroke care. Thus, results from all orthoptists were pooled.

Vision Screening and/or Assessment

Patients with vision problems were reported by 44.5% of orthoptists as being seen at later than 4 weeks post stroke. This delay between stroke and visual assessment is likely due to stroke survivors being assessed most frequently in eye clinics than as in-patients on stroke units/wards. Barriers to provision of stroke unit-based assessment include numbers of orthoptists available to facilitate assessments on stroke units or lack of funding (4).Thus early treatment is potentially missed which could alleviate troublesome visual symptoms with failure to advise on compensatory strategies to make best use of residual visual function.

Confrontation was used for visual field assessment by more than half of orthoptists and this is acknowledged as an appropriate bed-side assessment (9,10). However, where visual field loss was identified, formal perimetry methods (static and kinetic options) were used to plot visual field loss accurately. Assessment of nine positions of gaze for eye movements was undertaken by three quarters of orthoptists which is far greater than non-eye professionals who are more likely to test only horizontal or vertical eye movements (11). Thus the latter risk missing defects in other gaze positions. In a previous survey (4), it was clear that no standardised assessment of visual function was made for post-stroke visual impairment. Furthermore it was unclear whether assessments for visual function were provided for all stroke survivors or just for those with suspected visual problems. This international survey of orthoptists showed a clear use of validated visual tests with agreement in choice of assessments for visual acuity, visual fields, ocular alignment, ocular motility and binocular vision. This is encouraging as there is a need for agreed core outcome measures in this population (12). These results may form the basis for development of such outcomes. Standardised core measures should specify the minimum assessments that should be attempted (considering patient ability) which are not time consuming or too onerous for the patient to complete (11).

Visual Symptoms and Conditions

We asked orthoptists how frequently they recognised visual symptoms; i.e. not indicative of how frequently these visual symptoms are reported by patients but how frequently they were recognised by orthoptists. The most commonly recognised visual symptoms by orthoptists included blurred vision, changed or altered vision, field loss, diplopia, reading difficulties and clumsiness. This was similar to the previous survey (4) but with exceptions for facial weakness which was noted more by stroke team professionals, and diplopia/depth perception which were noted more by orthoptists.

This survey asked how commonly visual problems were suspected in patients who could not report their visual symptoms. In such circumstances, orthoptists highlighted that visual problems were frequently suspected and subsequently reported by family or members of the stroke team (86.6%). The period of follow-up typically provided was 1-3 months but with considerable variation from no follow-up being provided through to patients being followed for greater than 1 year. However, for those receiving long-term follow-up, these patients were more likely to be those with ocular motility abnormalities.

Visual Rehabilitation and Referrals

Similar to choice of visual assessments, internationally, orthoptists showed agreement in choice of treatment options targeted towards specific visual conditions and symptoms. The most common treatment options that were provided included refraction, low vision aids, prisms, occlusions, scanning training and reading strategies. Use of prisms and occlusion were higher than previously reported by stroke team professionals (4) whereas provision of functional advice was lower.

Three quarters reported they would treat, either always or sometimes, if a patient had visual impairment but was not reporting visual symptoms. Orthoptist concerns for the patients,

thereby prompting them to treat, included concerns for safety, improving response to general rehabilitation, improving patient awareness of their vision and to prevent further deterioration of visual function. This is an important point for consideration as failure to recognise or report visual symptoms is well recognised in stroke survivors due to cognitive/communication issues (3). In these circumstances, gaining consent for treatment may not be possible. Treatment to improve patient awareness, improve their engagement with rehabilitation and improve quality of life are in the best interests of the patient by making best use of their residual vision.

Care Pathways, Resources and Knowledge Base

Care pathways for visual problems were used by 56.9% of orthoptists. Our figure is higher than the UK professional survey (4) but may relate to this current survey being orthoptist-response only. There still remains a need to improve access to and use of nationally agreed care pathways to facilitate improved, equitable care provision for post-stroke visual impairment. Care pathway use has been identified as a key recommendation of high quality stroke and vision services (11).

When asked about provision of resources 85.9% of our respondents provided information about visual impairment. This high provision of information may be due to this survey being completed by orthoptists only. However, provision of information is an important aspect of care and reported by stroke survivors as being highly valued by them (1).

Limitations

We received 299 responses to our professional survey of which 63% were from UK orthoptists. We had hoped to receive a greater range of international responses.

A further limitation of the survey was that it required completion in one stage which took approximately 18 minutes for full completion. Therefore if individuals had not allowed sufficient time to complete the survey or for those who found it difficult to complete (as raised previously) and withdrew, there was no option to return to where they had stopped and complete it later. For those returning to the survey, they would have to start the survey from the beginning and the survey script would count them as a new respondent. It is likely that some of the 165 who failed to complete the survey did return to the survey at a different time and complete it. Thus this figure may overestimate the true number of non-completions.

Strengths

Regardless of country, responses from orthoptists showed consistency for aspects such as visual screening, assessment, rehabilitation choices, referrals and resource use. Such consistency is an important finding for orthoptic practice in stroke care. Previous studies have shown that problems exist with identification of stroke survivors with visual impairment (7,13) but that there is considerable patient benefit when orthoptists are involved directly in stroke care (14).

Conclusions

Post stroke visual impairment occurs frequently. It is evident from this international survey of orthoptists that, regardless of country, similar choices are made for use of validated vision tests in the assessment of stroke survivors. Furthermore, similar choices are made for choice of treatment options targeted to the specific visual conditions and symptoms encountered in stroke survivors. There is a clear need for core outcome measurements among various populations. The results of this survey may guide the development process to generate a core set of outcome measurements for the assessment of visual function in stroke survivors. In the

knowledge that orthoptic input to the core stroke multi-disciplinary team is of benefit, the results of this international survey indicate that the role of the Orthoptist in stroke care can be undertaken at a similar level internationally.

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Figure 1 Country of respondents

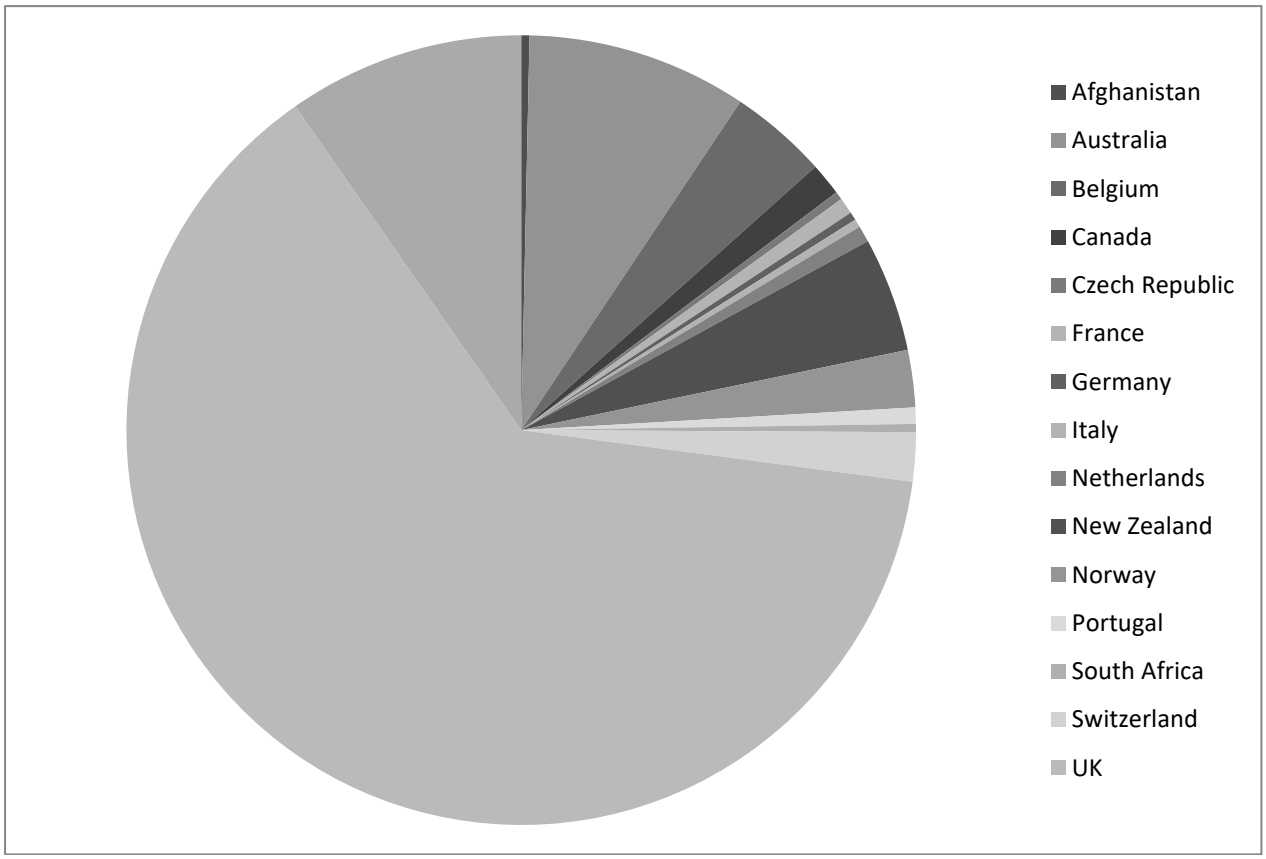
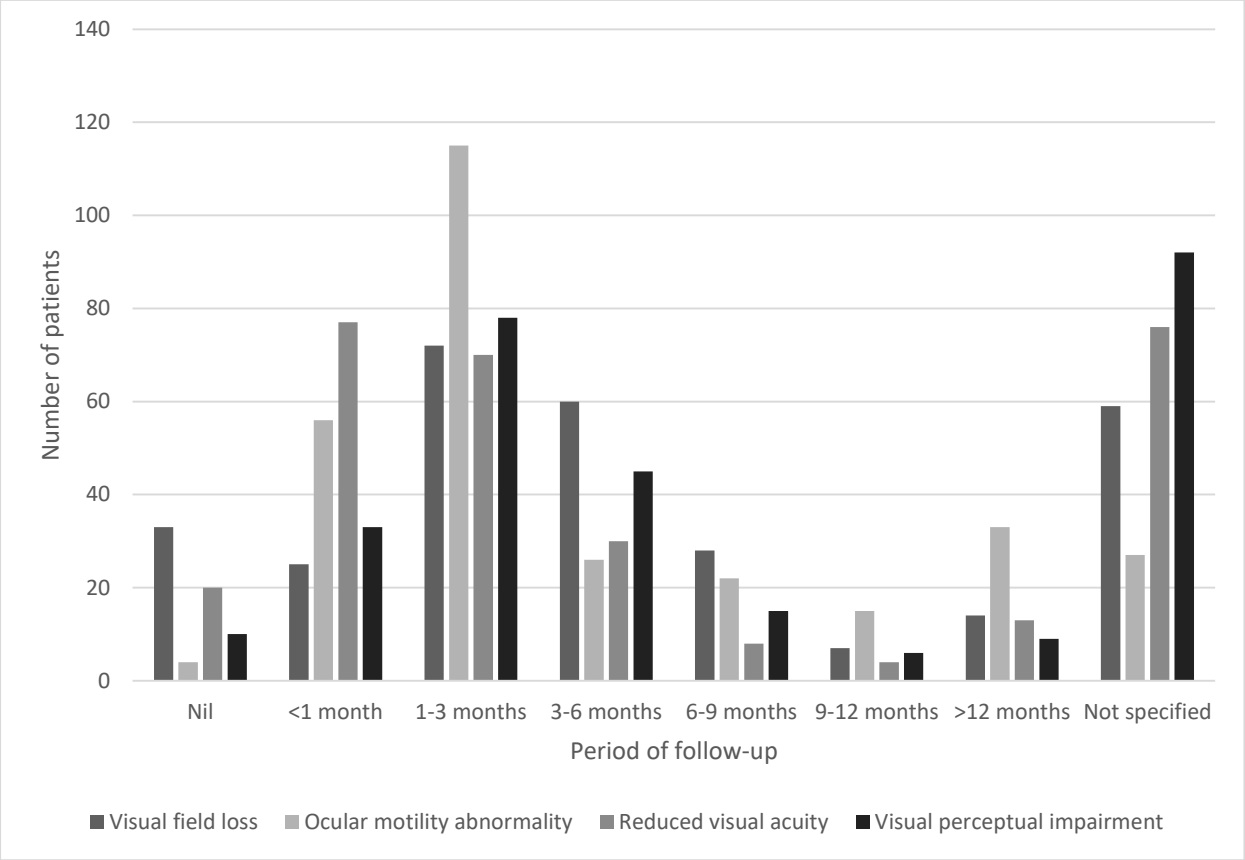


Figure 2 Period of follow-up provided versus visual impairment type



Appendix 1 Survey questions

GENERAL INFORMATION

Q1. Please select your country of work.

Q2. Which ONE of these best describes your main place of work?

SCREENING AND ASSESSMENT

Q3. Are stroke patients referred directly to you or your service?

If YES, answer Q4 and 5. If NO, go to Q6.

Q4. Where are they referred from? Please tick all that apply

Q5. At what point, post stroke, do you first see most stroke patients with visual problems?

Q6. How do you personally routinely test for visual problems in stroke patients?

ASK FOR EACH MENTIONED AT Q6
Q7. How frequently do you use…

ASK FOR EACH MENTIONED AT Q6
Q8. Which… do you use?

Q9. Where do you undertake your routine vision tests for stroke patients?

TYPES OF VISUAL PROBLEMS

Q10. How often are these visual problems reported by your patients because of their stroke?

Q10a. Are there any other visual problems that patients report because of their stroke that have not been mentioned already?

IF YES AT Q10a
Q10b. How often is [*text fill from Q10a 'specify'*] reported for your patients because of their stroke?

Q10c. How often are any visual problems with patients reported by their family or friends or by health professionals?

Q11. How often do these underlying visual conditions cause symptoms in your stroke patients?

Q11a. Are there any other underlying visual conditions that cause symptoms in your stroke patients that we have not already mentioned?

IF YES

Q11b. How often does [*text fill from Q11a 'specify'*] cause symptoms in your stroke patients?

MANAGEMENT AND INTERVENTIONS

Q12.What treatment options for visual problems do you personally routinely provide or routinely refer for in your stroke patients?

ASK FOR EACH MENTIONED AT Q12
Q13. And how often do you do this for …?

ASK FOR EACH MENTIONED AT Q12
Q14 And do you provide … personally or refer patients elsewhere?

ASK ALL
Q15. If patients are visually asymptomatic but have an underlying visual condition that you have identified, do you still treat e.g. for functional improvements?

No, never - *GO TO Q17*
Don't know - *GO TO Q17*

ASK THOSE WHO ALWAYS/SOMETIMES TREAT AT Q15
Q16. Please explain why you treat visually asymptomatic patients with an underlying visual condition that you have identified?

Q17. What specific aspects of practical support would you personally expect to cover when seeing a person who has had a stroke and who has or might have visual problems?

Q18. How long is your typical minimum period of follow up for patients with the following problems after their stroke?

REFERRAL OPTIONS

Q19. Who do you refer your stroke patients to in eye services?

ASK ALL WHO REFER STROKE PATIENTS
Q20. Do you use a care pathway to guide management and referrals to eye services?

ASK ALL
Q21. Which services do you sign-post your patients to?

Q22. Please comment on anything else you would like to highlight about your service or about this topic

Q23. Please indicate whether we can contact you again in relation to this survey if we have further questions to ask about your best practice in stroke services.

Table 1 Timing of first vision assessment

	Immediately/inside a week	**After a week, inside a fortnight**	**After two weeks, inside 4 weeks**	**After 4 weeks, inside 8 weeks**	**After 8 weeks, inside 12 weeks**	**After 12 weeks, inside 26 weeks**	**After 26 weeks**	**Total**
N (%)	40 (14.6%)	57 (20.9%)	55 (20.1%)	64 (23.4)	24 (8.8%)	17 (6.2)	16 (5.9)	273* (100%)

* 26 respondents did not provide information on timing of first vision assessment

Table 2 Type of visual assessments

Visual assessment type	Percentage use by respondents	Test type
Letter charts or tests	76.5%	logMAR charts (54.5%) Snellen's chart (48.2%) Fixation and following (26.1%) Vanishing optotypes (12.7%) Gratings (13.4%) Near acuity charts (8.4%) Others: Lea symbols, Kay's pictures and Sheridan Gardiner optotypes.
Visual field assessment	68.2%	Confrontation (52.2%) Static perimetry (44.1%) Kinetic perimetry (37.4%)
Ocular alignment assessment	80.6%	Cover test (92.6%) Observations of corneal reflections (63.5%)
Ocular movement assessment	80.9%	Nine position testing (78.3%)

		Horizontal and vertical gaze only (10%) Horizontal gaze only (6.7%) Vertical gaze only (6.3%) Others: vergence, saccades, Hess/Lees charts, optokinetic nystagmus and vestibulo-ocular reflex
Binocular vision assessment	77.9%	Stereopsis (76.2%) Fusional ability (59.5%) Retinal correspondence (32.8%)
Functional vision assessment	55.8%	Observations of navigation, reading, eye scanning, walking, activities of daily living, self-care, body placement, spatial awareness, mobility, writing, hand-eye coordination Carer observations
Questionnaire	11.4%	Locally designed questionnaires Validated questionnaires for activities of daily living Visual Function Questionnaire (NVQ25)

Table 3 Percent frequency of recognised symptoms

Symptom	Recognised frequently	Recognised sometimes	Recognised rarely	Not recognised / did not know
Reading difficulty	58.2%	37.1%	2.7%	4.3%
Changed or altered vision	44.8%	42.5%	6.4%	6.6%
Blurred vision	44.5%	45.5%	4%	6%
Visual field change	41.3%	44.8%	9.7%	6%
Clumsy / collisions	36.4%	46.2%	11%	7.4%
Diplopia	29.8%	60.2%	6.4%	3.7%
Depth impairment	23.7%	53.9%	15%	8%
Recognition impairment	12.7%	42.5%	31.1%	13.8%
Writing difficulty	11%	45.3%	26.4%	16.7%
Wobbling / juddery vision	8%	33.8%	47.5%	11.1%
Facial droop/ weakness	6.4%	46.8%	32.4%	14.4%
Compensatory head posture	6%	43.8%	39.5%	10.7%
Photophobia / glare	4.7%	30.8%	43.5%	21.4%

Lid droop	3.7%	51.8%	34.5%	10.1%
Visual hallucinations	3.3%	30.1%	47.2%	19.4%
Colour impairment	0.3%	12.7%	52.2%	34.7%

Table 4 Percent frequency of recognised visual conditions

Condition %	Recognised frequently	Recognised sometimes	Recognised rarely	Not recognised / did not know
Visual field loss	58.5%	35.1%	2%	4.4%
Reduced visual acuity	43.5%	48.5%	4%	4%
Ocular cranial nerve palsy	37.5%	53.5%	4.7%	4.3%
Strabismus	33.1%	55.5%	7%	4.3%
Visual inattention	30.4%	46.5%	14.4%	8.7%
Eye tracking defect	26.7%	55.5%	11%	6.7%
Ocular gaze palsy	23%	55.8%	16.4%	4.7%
Depth defect	19.7%	50.8%	19.4%	10%
Nystagmus	17%	47.8%	28.8%	6.3%
Ophthalmic condition	15%	47.8%	21.1%	16.1%
Perceptual defect	10%	42.8%	30.4%	16.7%
Visual agnosia	8%	37.8%	33.1%	21.1%
Visual hallucinations	7.4%	31.1%	35.5%	22.8%

Reduced contrast	7.4%	34.1%	27.8%	30.8%
Lid defect	6.7%	59.2%	26.1%	8%
Pupil defect	2.7%	39.1%	44.8%	13.4%
Colour defect	0.3%	20.4%	47.8%	31.4%

Table 5 Percent frequency of provided visual rehabilitation options

Rehabilitation	Provided	Frequently	Sometimes	Rarely
Prisms for diplopia	93.6%	64.2%	28.4%	1%
Monocular patch	89.9%	46.5%	39.5%	4%
Vision advice	89.9%	72.9%	15.7%	1.3%
Refraction / glasses	70.9%	40.1%	28.4%	2.3%
Reading strategies	65.9%	29.8%	30.1%	6%
Functional advice	55.9%	30.1%	20.1%	5.7%
Low vision aids	55.2%	11.4%	31.8%	12%
Prisms for gaze	52.5%	19.4%	24.7%	8.4%
Prisms for hemianopia	50.2%	9.7%	26.1%	14.4%
Eye scanning for hemianopia	43.8%	20.1%	20.1%	3.7%
Eye scanning for gaze	40.5%	17%	18.7%	4.7%
Ocular muscle botulinum toxin	33.8%	3.3%	20.7%	9.7%
Typoscope	29.1%	7.7%	15.7%	5.7%
Ocular muscle surgery	24%	2.6%	13.5%	8%

Partial sight registration	13.7%	3.7%	7.7%	2.3%