

Stroke and vision, special topic call for papers

The ability to see and interpret the visual world is perhaps the most valued of the human senses and is likely to be impaired by brain disease. This means that any form of brain damage, such as stroke, traumatic brain injury, tumours or neurological diseases can affect the visual function. Stroke is the most common acquired cause of neurological impairment in the adult population. More than 60% of all stroke survivors experience a vision problem after stroke (Rowe et al., 2019). Stroke is the second most common cause of death and disability worldwide, including the Scandinavian countries. Worldwide, there are over 12 million stroke incidents per year and a prevalence of 101 million cases (Feigin et al., 2021).

This editorial provides the authors' view on the challenges of vision rehabilitation after stroke from a Norwegian perspective in a global context. In Norway and other Scandinavian countries there are still challenges in ensuring all stroke survivors get their vision assessed and individuals with vision impairment are referred to relevant vision rehabilitation.

In Norway and Denmark, approximately 12 000 persons per year, or 30 persons per day, will have a stroke, and in Sweden the number is twice that (Stevens et al., 2017). This means that in the Nordic countries, almost 30 000 stroke survivors will experience vision impairment after stroke. The total cost of stroke cases per year is estimated to be €677 million in Denmark, €926 million in Norway and €1.455 million in Sweden. In the western world the median age of people suffering stroke is 75 years and because the population is ageing, the number of strokes will increase by 27% until 2047 (Wafa et al., 2020). This will put an increased burden on the health care system and on the rehabilitation systems, in particular vision rehabilitation which is our focus in this special topic editorial.

Post stroke visual impairments include reduced visual acuity, visual field defects, eye movement disorders and a variety of visual perception disorders (Hepworth & Rowe, 2016). Visual impairments are associated with an increase in falls, difficulties with activities of daily living, fatigue, and poor rehabilitation outcomes (Pedersen et al., 2023; Terroni et al., 2012; White et al., 2015). Regardless of severity, much can be done through vision rehabilitation to aid recovery from post stroke visual impairments and improve visual functions (Howard & Rowe, 2018; Rowe et al., 2018). Several studies conclude that assessing visual functions will raise self-awareness, and compensatory training is useful for vision outcomes and the general rehabilitation process (Ackerman et al., 2014; Smedslund & Myrhaug, 2017).

In Norway, the national guidelines state that vision should be assessed after stroke, and patients with visual problems should be referred to an ophthalmologist, optometrist, or other eye-care specialist. The guidelines also state that compensatory training after visual field loss should be recommended (Norwegian Directorate of Health, 2017). Learning to live with a sudden loss of vision is a complex task closely intertwined with existential and social aspects (Nyman et al., 2010). Failing to identify visual problems after stroke can have a severe negative impact on the patient's coping, further recovery and quality of life (Falkenberg et al., 2020; Hepworth & Rowe, 2016; Hepworth et al., 2021; Tharaldsen et al., 2020). Early identification of post stroke visual impairments followed by individual information and education, together with vision rehabilitation at the right time may reduce these negative consequences (Mathisen, 2022; Mathisen et al., 2021; Rowe et al., 2020). Vision rehabilitation may contribute to improving quality of life and reducing the need for formal or informal care and is likely to improve general rehabilitation outcomes.

Visual problems remain one of the most overlooked and under-treated sequelae following stroke (Lofthus & Olsvik, 2012; Rowe, 2017; Sand et al., 2012). One reason is that health care professionals state that they fail to refer stroke patients for vision examination and vision rehabilitation because there is a lack of services (Huseby et al., 2017). Another reason is that visual functions are inadequately documented and there is a lack of systematic assessment, treatment or rehabilitation strategy (Mathisen, 2022). A third reason is that symptoms of visual problems are often missed by both patients and stroke care professionals (Mathisen et al., 2021). Symptoms of vision problems can also reveal impairments that go beyond the visual system, and much can be gained about other sequelae of stroke by identifying the underlying cause. In short, there is a risk that patients are being discharged from hospitals into the community without anyone being aware of visual problems that may limit the success of other rehabilitation, the degree of recovery, and quality of everyday life (Berthold-Lindstedt et al., 2017; Bourne et al., 2017).

Vision specialists needs to be included in interdisciplinary stroke care

One of the greatest improvements in stroke management has been the implementation of interdisciplinary stroke units in acute care (Langhorne et al., 2020). The interdisciplinary approach has significantly changed the outcomes for stroke survivors and reduced mortality rates (Feigin et al., 2021). These teams consists of professional disciplines covering medical, physical, cognitive, and mental functions (Langhorne et al., 2020). However, professionals with vision expertise are not traditionally an integrated part of the interdisciplinary stroke team (Feigin et al., 2019) or included in the patient pathway, even if there are a few exceptions in both Norway and Sweden. Another barrier is that health care and adult education services for stroke survivors are governed from different directorates, laws and regulations.

A first and essential step in improving vision care after stroke is to assess and identify visual problems in stroke survivors, and adapting international research and good practice is both important and feasible. In Norway, many stroke and rehabilitation units have implemented the "KROSS" vision tool (Falkenberg et al., 2016; Mathisen, 2022) in their services. The KROSS tool is used to identify the presence of vision problems including reduced visual acuity, central and peripheral visual field loss, oculomotor problems and reduced visual attention. KROSS is similar to the VISA tool developed in the UK (Rowe et al., 2018; 2020).

Vision and stroke need to be integrated in interdisciplinary health care education programmes

The lack of focus on vision and visual problems in the education of different health care professions is a major problem, as most stroke patients need help from many different professionals. In addition to basic vision competence, there is a need for more advanced competence for stroke professionals. The University of South-Eastern Norway offers a Nordic course in vision rehabilitation after stroke and other acquired brain damage. The 20 ECT course is interdisciplinary and has approximately 20 students per year with both health care and educational professionals, including optometrists, ophthalmic nurses, and vision education specialists. However, there is a need for a wider portfolio of educational courses to advance competence and bring much needed knowledge and collaboration within all aspects of vision

rehabilitation after stroke.

Although visual impairments following stroke have recently been given more attention in research and stroke care, there is still need for more knowledge, better interdisciplinary collaboration, and more structured national and local clinical guidelines to promote equal, sustainable health services after stroke and other brain disease. Norway is a large territory with a small population with several small municipalities taking care of stroke patients. It is necessary to (re) think how specialised knowledge about vision and stroke should reach these patients. One important initiative has been the interdisciplinary Norwegian Vision in Stroke network (NorVIS) that started in 2019. NorVIS is a large national network supported by The Research Council of Norway, and consists of more than 36 partners from academia, patient and user organisations, and professionals from health care and education across disciplines and sectors. International academic researchers and vision rehabilitation service providers contribute with their expertise and experiences from UK, Sweden, Denmark and The Netherlands. The overall purpose of NorVIS is to reduce the burden of stroke by promoting research-based routines for vision assessment, care, and rehabilitation across all segments of health care services in Norway (www.synogslagnett.no). NorVIS poses as an attractive consortium partner and platform to coordinate and cooperate in developing national or international interdisciplinary education, research, and innovation to strengthen clinical practice of vision rehabilitation after stroke.

Call for papers for special issue on vision and stroke

Development of new knowledge in complex areas such as sequelae caused by stroke requires multifaceted and creative research.

SJOVS therefore want to invite a broad range of researchers from all corners of the world to submit their manuscripts to be published in open access online within the special topic vision and stroke, and brain damage due to other causes. Topics may include, but are not limited to:

- the best way of organising post stroke vision care,
- patients' perspectives of living with post stroke visual impairments,
- effective treatments and vision rehabilitation,
- interdisciplinary interventions that include vision rehabilitation,
- innovative technological solutions for vision assessment and training,
- how to raise awareness for vision issues among patients and health care personnel.

We encourage translational research, with a variety of methodologies, including qualitative, quantitative, mixed methods, or reviews to share knowledge about vision and stroke.

Torgeir Solberg Mathisen
Guest Editor

António Filipe Macedo
Associate Editor

Helle K. Falkenberg
Associate Editor

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