Stroke related eye conditions

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About stroke
Stroke is the most common cause of adult disability. Every year an estimated 150,000 people in the UK suffer from a stroke. Most strokes happen to people who are over the age of 65 but it can occur in all age groups.

Strokes occur when a part of the brain is starved of oxygen. Oxygen is found in our blood and travels throughout all parts of the body including the brain. Blood travels around the body through blood vessels which include arteries, veins and capillaries. The two common causes of stroke are blood clots and bleeding. A blood clot prevents oxygen from being delivered to a part of the brain. Bleeding can occur where a part of the blood vessel wall is weakened causing it to burst and bleed into the brain.

The effects of a stroke are dependent on what part of the brain was affected or starved of oxygen. Every stroke is different and the symptoms and degree of damage are very individual. Some people are mildly affected by the stroke for a short time while others may suffer long term disabilities from the stroke. Some of the common effects of stroke include difficulty or problems with walking, language or speech, mental processes, swallowing, paralysis and eyesight.

As seeing involves not only the eyes but the brain as well, stroke-related vision problems can be very complex to understand and treat.

Before reading this page you may find it helpful to know how the eye works.

Effect of stroke on vision
Visual problems are more common in people who have suffered a stroke affecting the right side of their brain. The damage the stroke does in the brain impacts the visual pathways of the eye which can result in visual field loss, blurry vision, double vision and moving images. When stroke affects the areas of the brain that processes the information we see, it can cause ‘visual neglect’ (lack of awareness to one half of the body or space) as well as difficulties with judging depth and movement. In a few cases, visual problems caused by stroke can improve on their own with time.

Some of the vision problems that occur as a result of a stroke include loss of part of vision or loss of visual field. Visual field is the term used to describe the whole of our vision, from the centre to the periphery. It refers to everything we can see in the periphery (around the edges of our vision) as well as what we are directly looking at (central vision). Strokes can cause whole sections of the visual field to be missing.

Other visual problems that may occur as a result of stroke include eye muscle and nerve problems which can result in double vision and moving images as well as other effects such as sensitivity to light.
Treatment

There are various techniques that can be used to try to help or compensate for the various visual effects of stroke. These include glasses, prisms, patching, magnifiers and scanning information to name a few.

The focus in working with stroke sufferers is on rehabilitation and that also applies with vision related problems. Orthoptists and Low Vision Specialists can assess and work with people with visual training with or without optical aids; the stroke team, GP or Ophthalmologist can refer people for an orthoptic assessment and / or to the Low Vision Clinic.

Some people may see some improvement in their vision up to four months following a stroke. Again, this is highly dependent on where the damage in the brain occurred as well as the type of stroke suffered and other existing health problems. Unfortunately for many people, especially those with loss of visual field, sight loss may be permanent.

Vision problems as a result of stroke

Field loss (Hemianopia)

This type of field loss refers to not being able to see to either to the left or right from the centre of your field of vision. People who suffer from a stroke to one side of the brain may develop field loss to the opposite side. The extent of field loss can vary and is directly related to the area of the brain that has been affected by the stroke. Often people may lose half of their visual field meaning they can only see with either the right or left half of each eye - this is called hemianopia.

Hemianopia is a loss of one half of the visual field. It can occur in the right half of each eye called 'right homonymous hemianopia' or in the left visual field referred to as 'left homonymous hemianopia'.

Left homonymous hemianopia

The extent of vision loss can vary from slight to severe. Some people with hemianopia are aware that they are not able to see from a part of their field and can be taught scanning techniques (eye movement patterns) in the direction of the hemianopia in order to compensate.

Reading can also be a very frustrating experience for someone with hemianopia. A person with right hemianopia misses the end of words or end of the line. Missing the end of words will result in changing the meanings of words and sentences. Sometimes using a marker at the end of the sentence or a post it note to indicate where the end of the line is can be helpful for some. A typoscope (a piece of card with a piece cut out) can help. People with left hemianopia have difficulty finding the beginning of the sentence and finding the next line of text. Once again, using a post it note or ruler to mark the beginning of the text and underneath text can be helpful. People may also benefit from tilting the text and reading it vertically.

Optical aids may be used to help increase a person's field of view and must be fitted by an eye care professional. These may be in the form of prisms which can either be temporary or permanent and applied on the affected side. A prism is a special, transparent, plastic sheet which can be customised to fit any pair of glasses. Prisms do not change the focus or prescription of the lens, but can shift an image either to the right, left, above or below or diagonally as needed. Initially, temporary prisms will be applied to spectacles to ensure correct positioning, and during visual training. These prisms are stuck on the back surface of spectacles and can easily peel off if not required. Permanent prisms are mounted into the spectacle frame - into the lens itself. Training with prisms can involve scanning and safety issues while the person is in a sitting or standing position and progressing to walking. With the appropriate training, prisms can help people with field loss in all areas of day to day living including navigating around obstacles better while walking.

Other optical aids that may be used are small mirrors attached to spectacles (hemianopic spectacles) that can be adjusted by the wearer. Inverted telescopes which require good central visual acuity can increase visual field.
Eye muscle and nerve problems (Diplopia)
A stroke may lead to problems with eye movements which result in both eyes not working together as a pair.

This can make it difficult to focus on specific things because of blurred vision as well as diplopia (or double vision) which impacts on reading, walking and performing everyday activities. People may also experience problems with their fast (saccades) or slow (pursuit) eye movements, making it very difficult for the person to focus visually. In addition, their eyes may wobble (nystagmus) or they may not be able to move both eyes together in a particular direction (gaze palsy). However, recognising this problem can help the person affected by stroke and their carers to understand what is going on.

Treatment can involve prisms, exercises and occlusion. Prisms may not only be useful for increasing the field of view but can help eliminate double vision. Occluding or patching one eye is another effective solution for double vision. However, this method will result in the person having monocular vision, that is vision in one eye only. Monocular vision can itself cause problems such as reduced depth perception (judging how high a step is or how far away something is) and mobility issues due to reduced field of vision.

Occlusion does not have to cover the entire lens. Sometimes covering only a part of the lens in the line of sight that is causing the double vision can be done. This form of patching will not result in the person being monocular and therefore may not have as many problems with navigation and mobility.

Vision processing
Visual neglect is more common in people who suffered from a stroke in the right side of the brain affecting the left side of the body. Unfortunately, a person with both visual field loss and neglect are less likely to respond to scanning techniques or compensate for the defect. People suffering from neglect may ignore food on one half of their plate, avoid shaving or applying make-up to one side of their face as well as being unaware of objects and people that are on the affected side resulting in the person ignoring or bumping into objects that are on that side of them. Treatment for neglect can include prisms or occlusion but most often people are advised on scanning and awareness strategies to cope with their neglect.

Often a person may be able to read text readily but be unable to make sense of the text. They may attribute this to not being able to see the text properly when it is actually due to not being able to process the information they have read.

Other vision problems associated with stroke
A common effect of stroke-related vision problems is an increased sensitivity to light. The brain seems to have difficulty adjusting to different levels of light. Tinted glasses or sunglasses may be helpful in reducing the discomfort some people experience.

Another problem which can follow stroke is dry eye. The rate of blinking may slow following a stroke and/or there may be incomplete eye closure with a partial blink which will cause a part of the cornea to dry resulting in the eye feeling uncomfortable. Artificial tears, and reminding the person to try to blink completely and often, may be a possible solution for dry eyes.
What next

Supporting your recovery
Orthoptists play an essential role in assessing and managing many of the visual problems that may result from a stroke. Visual training, with or without optical aids, can be led by orthoptists as well as professionals in Low Vision.

Other health professionals who may be involved in the rehabilitation and recovery process of people who have had a stroke can include:

- doctors
- nurses
- physiotherapists
- occupational therapists
- speech therapists
- rehabilitation workers.

If you experience any visual difficulties following a stroke, it is important that you have your eyes examined by eye care specialists.