

Visual problems after brain injury



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Introduction

Vision is the skill that allows us to see the world around us. When we look at the world, a complex series of processes takes place between the eyes and the brain. The eyes take in the information, while the brain (which is connected to the eyes by a nerve called the optic nerve) is responsible for processing and interpreting it. Through this system we are able to see things such as colours, shapes, movement, objects and people.

When the brain is injured, the ability to interpret visual information can be affected in different ways.

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This publication has been written to explain how brain injury can affect vision and how to see professional support with these issues. Tips for coping with visual problems are also offered.

The information in this publication does not replace clinical guidance from medical professionals. You should always seek advice from a GP or other suitably qualified professional for help with managing the effects of brain injury.

What is vision?

There are lots of different aspects of vision. Some of the things the brain needs to do to decode information that it receives from the eyes are:

- Process the shape and colour of objects
- Process and merge information received from both eyes
- Recall information from memory to recognise objects or places
- Process the movement of objects
- Process the location and position of an object in space
- Process information across the **visual field** (including **peripheral vision**)

Generally, different parts of the brain are responsible for processing these different aspects of vision. However, the majority of visual processing take place in an area at the back of the brain called the occipital lobe.

Injury to the brain can therefore affect any aspect of vision, especially if the occipital lobe is injured, through, for instance, a road traffic collision in which the brain is rocked back and forth.

Visual problems following brain injury can affect both the quality of the information received by the brain and interpretation of the information received. As a result, brain injury survivors can experience a number of different types of visual problems which can range from mild to severe.

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Types of visual problems

Visual acuity loss

Visual acuity loss refers to a loss of clarity of vision, so that objects can seem blurry or unclear. This is also commonly known as 'blurred vision'. If this occurs after a minor head injury, such as through a sporting accident, it is very important to attend your nearest Accident and Emergency Department as soon as possible.

Visual field loss

Parts of the visual field can be lost or affected after brain injury so that there may be missing patches across a section of it (these may appear as black patches or fuzziness in a particular area). A brain injury survivor with visual field loss can lose half of their whole visual field (known as hemianopia), a quarter of the field (quadrantanopia) or parts of the field seen by each eye. Vision might also be lost or affected around the edges or towards the centre of the visual fields.

Double vision

Double vision is also known as diplopia. It causes two images of a single object to be seen at the same time. This occurs because the brain is unable to merge the information it is receiving from both eyes. As with blurred vision, if this is experienced after a minor head injury, it is very important to attend your nearest Accident and Emergency Department as soon as possible.

Nystagmus

Nystagmus is a condition in which there is an involuntary rhythmic shaking of the eyes, which may occur from side to side, up and down or in a circular motion. This affects the quality of visual information received by the brain, and can cause symptoms such as vertigo or nausea. Nystagmus that develops after brain injury is known as acquired nystagmus.

Blindness

Complete blindness after brain injury is rare. For this to occur, there must be significant damage to the optic nerves, the visual pathways and areas of the brain, or the occurrence of a penetrative injury such as a gunshot injury.

Visual agnosia

This is a term that covers an ability to recognise objects. There are two different

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types of visual agnosia: ‘apperceptive agnosia’ and ‘associative agnosia’. In apperceptive agnosia, there are problems with processing basic perceptual aspects of an object such as shape and colour, and integrating this information. A brain injury survivor with this type of agnosia can struggle with object identification. In associative agnosia, a survivor retains the ability to identify visual aspects of an object but fails to recall what it actually is. For instance, a survivor with associative agnosia holding a key might be able to describe its shape, how it feels and what it is used for, but fails to recall what it actually is. For instance, a survivor with associative agnosia holding a key might be able to describe its shape, how it feels and what it is used for, but fail to identify it as a ‘key’.

Face blindness

Known as ‘prosopagnosia’, this is a specific type of agnosia and refers to a person being unable to interpret and recognise faces, including loved ones or famous faces. In extreme cases, a person may even be unable to recognise themselves. This occurs when a particular part of the brain responsible for processing faces, known as the fusiform face area is affected. For more information on this, see our publication [Face blindness \(prosopagnosia\) after brain injury](#).

Visual neglect

This is sometimes referred to as ‘hemineglect’ or simply ‘neglect’. In this condition, a person fails to attend to visual information on one side of their sides even though they can actually see it. They may, for instance, fail to eat half of their plate of food, or fail to brush their hair or teeth on one side. While hemineglect is, strictly speaking, more of a problem with attention than vision, it can be misinterpreted as a visual problem unless careful observation or testing is done.

Photophobia

This is an increased sensitivity to light, to the point where it causes discomfort or pain. In some cases this sensitivity might be to a particular type of light. It is a commonly reported visual problem after sustaining a traumatic brain injury, but research has found that in around half of cases it does improve over time. Photophobia can make some survivors reluctant to going outdoors or into bright places.

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Colour vision changes

While most cases of colour blindness occur from birth, it can also happen after brain injury - this is known as cerebral achromatopsia. For people with this issue, colours may appear different, washed out or, in more severe cases, shades of grey. Loss of colour vision can affect enjoyment of things such as food or can cause safety concerns, for instance if a survivor struggles with identifying traffic light colours.

Depth perception

Otherwise known as stereopsis, this skill allows us to judge the distance between objects to enable us to do things such as assessing how far away something is. A brain injury survivor with this issue might struggle to reach out for objects, climb stairs safely, drive or navigate around.

Motor vision

Otherwise known as akinetopsia, this is the ability to process movement of objects, such as people walking, cars driving or birds flying. To brain injury survivors with motion vision problems, such things may appear as static images rather than smoothly moving objects.

Impact of visual problems

Vision is one of our most important senses, as it allows us to navigate our way around the world. Experiencing problems with vision can make some brain injury survivors feel a sense of loss, grief, depression or anger, as their perception of the world changes and this can affect their quality of life, relationships or safety. When vision is affected, it can have a major impact on a range of day-to-day skills that we rely on to safely get around. Some examples of this are offered below.

Dizziness and balance problems

As the body's balance system relies partly on visual information received, problems with vision can cause dizziness and balance issues. More information on this is available in our publication [*Balance issues and dizziness after brain injury*](#).

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Driving

Driving relies heavily on the ability to quickly and accurately interpret visual information from the whole visual field. For instance, hazards can appear on the road any time, and a driver must be able to detect these before they become a danger and respond accordingly. As such, a person may be unable to drive if their vision has been affected after brain injury. Other effects of brain injury can also affect driving ability.

If you have had a significant brain injury and want to drive, you **must** inform the relevant licensing authorities. Failure to do this could result in a fine of up to £1,000. More information on this is available in our publication [Driving after brain injury](#).

Employment and education

While vision can be an important part of many people's employment or education, not all jobs rely heavily on it. Further, as part of the Equality Act (2010), all employers are required to make reasonable adjustments to the workplace for a disabled employee, so where vision may be limited, it is often possible to have adjustments made to the role or workplace environment. For example, brighter lights could be used where this helps, or audio recordings could be made of meetings rather than relying on written notes.

Further information on this is available in our publications [Returning to work after brain injury](#) and [Employers' guide to brain injury](#).

Reading

Reading is an activity that people rely on for many day-to-day aspects of life, as well as leisure. Reading material can be made available in a range of different formats to assist people with visual problems. For instance, where vision is limited, audio books, increased brightness, text-to-speech readers and smartphone magnifiers can be used instead.

Marking the tops of pages with brightly coloured sticky tabs can help with visual neglect to attract their attention to neglected pages. Some people with hemianopia or quadrantanopia may also find it easier to read if the page is

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rotated by 90 degrees.

Socialising

We often rely on vision to socialise, for instance to recognise people we are meeting up with. This can be problematic if, for instance, a person has prosopagnosia (see section *Types of visual problems*). Navigating around can be challenging, or even risky, especially if parts of the visual fields are blurry or missing. If you have visual problems it can be helpful to talk these through with your friends so that you are socialising in an environment that is comfortable and safe for you. For guidance on talking to friends about the effects of brain injury, see our publication [Friends' guide to brain injury](#).

Diagnosing and treating visual problems after brain injury

The visual pathway is a complex one, consisting of multiple stages between the eye and the brain. As a result, diagnosis can often be delayed even when visual problems have been detected, as clinicians need to identify whether the problems relate to the brain itself or the eyes.

Problems with vision can be assessed and, if possible, treated within hospitals. Often this will be within an eye clinic. Some hospitals have Eye Clinic Liaison Officers who can assist with getting appropriate support.

Some basic visual tests such as visual acuity or visual field tests can be completed to test for visual problems. In some cases, it may be more useful to examine damage to the brain using neuroimaging tools such as CT or MRI scans. For more information on this, see our publication [Scans and tests after brain injury](#).

When colour vision is affected, there are a number of colour vision tests that can be administered, such as the Ishihara Plate Test.

Ideally, a brain injury survivor with visual problems should be assessed by a neuro-ophthalmologist. These eye doctors specialise in the brain's role in the visual system. Although neuro-ophthalmologists are not commonly found across the UK, it is always worth speaking to your GP or an optician in the first instance about trying to get a referral to one.

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Ophthalmologists or orthoptists can also diagnose and treat the range of visual problems that commonly occur after brain injury, and are much more accessible in the UK. Again, you should speak to your GP or an optician about getting a referral to these professionals.

Some of the professionals listed above may also work in private practice.

Surgery can sometimes help visual problems that have arisen following eye damage caused by brain injury, for instance if there is bleeding in the eye or if activity in the muscles surrounding the eye need correcting following an injury to the brain. However, the use of this method is very specialised and will depend on the exact nature of the visual problem at hand.

Tips for coping with visual problems after brain injury

As there are such a wide range of different types of visual problems after brain injury, there is no single way of coping with them. However, the following strategies are commonly used methods to help with managing visual problems after brain injury.

- Less complex visual problems such as double vision can sometimes be corrected with the use of adjusted glasses or contact lenses, so an optician might be able to help with these.
- Adapted technology can make it more comfortable for you to use devices such as mobile phones and computers. For instance, many devices come with adjustable screen settings so that you can make text larger or more contrasted, or the screen can be made brighter. You could also use a screen reader, through which your computer or mobile can read text aloud.
- Use items with bigger features, such as clocks with large numbers or books and screens with large text. Some items such as telephones and remote controls are also available with larger buttons.
- Keep walkways clutter-free to minimise the risk of tripping
- Take things at a slower pace where you can, especially if you have issues such as dizziness or balance problems. This can include physically slowing

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- down i.e. walking, reading or moving more slowly, or taking the time to focus on things more carefully than you did before your injury.
- Visual prompts can help with some types of visual problems such as visual agnosia, prosopagnosia or visual neglect. For example, reminding people with visual neglect to turn their attention towards the neglected side of space can sometimes help. For people with prosopagnosia, focusing on non-facial features of a person, such as the person's voice or hairstyle, can help with identifying them. For more tips on coping with prosopagnosia, see the our publication [Face blindness \(prosopagnosia\) after brain injury.](#)
- Consider exploring visual awareness exercises or games if you have difficulties with attending to different areas of your vision
- Contact your local authority's social services team for advice on how they can help. For instance, they might be able to offer personal care at home, help with shopping or arrange for adaptations to be made to your home to make it easier for you to get around safely and comfortably.
- While some people with photophobia use darkened sunglasses, research suggests that in some cases these might actually prolong or worsen sensitivity to light. Instead, there may be certain types of tinted glasses that can help. A neuro-ophthalmologist, or some specialist optometrists (opticians) can explore this option with you and help you to find a tint that is comfortable for you (different tints work for different people).
- If your vision is affected to the point where you are struggling to cope on a day-to-day basis, consider whether you would find it beneficial to register as visually impaired. An ophthalmologist can assess whether you would be eligible to register as either Sight Impaired or Severely Sight Impaired depending on the severity of your visual problems. Registering as visually impaired makes your GP and local social services team aware of your visual problems, which can ensure that you receive support from them accordingly.
- If you struggle with safely getting around by yourself, you could consider getting a guide dog. Remember that even though guide dogs have been trained to offer assistance, getting a dog can be a big commitment. You can get advice on whether this is a suitable option for you from organisations

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such as Guide Dogs (www.guidedogs.org.uk).

- Most importantly, don't be afraid to ask for help! This can be from family, friends or even day-to-day encounters, such as someone standing at a bus stop with you, or someone working in a supermarket. You may find it helpful to show them your Headway Brain Injury Identity Card. To learn more about the card and apply, visit www.headway.org.uk/supporting-you/brain-injury-identity-card.

Acknowledgements

Many thanks to Mr Tom Eke, Consultant Ophthalmologist at Norfolk and Norwich University NHS Foundation Trust, who kindly contributed to this publication.

As a charity, we rely on donations from people like you to continue being able to provide free information to those affected by brain injury. To donate, or find out how else you can get involved with supporting our work, visit www.headway.org.uk/get-involved.

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Last reviewed 2020. Next review 2023.

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