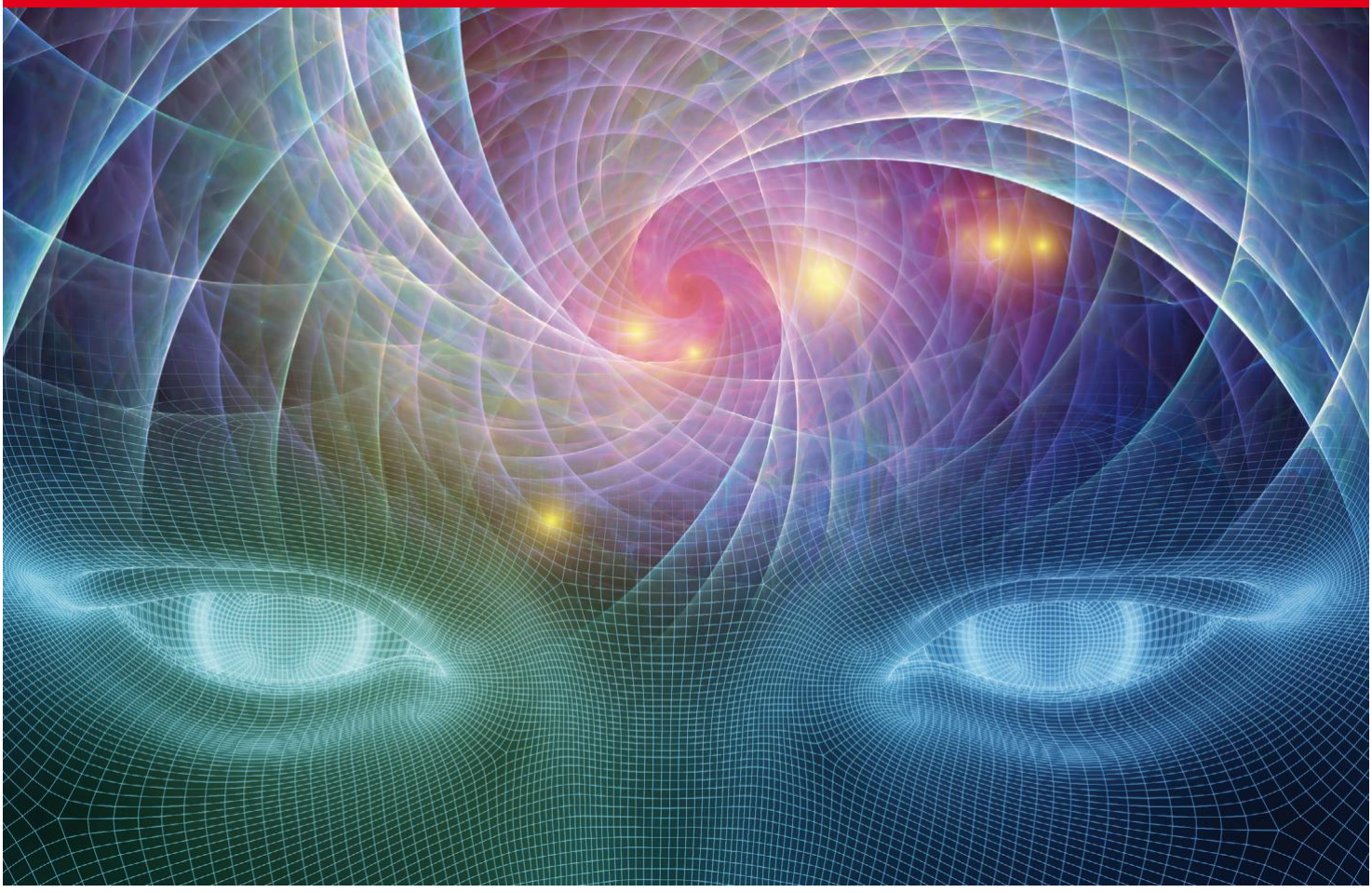
BIOS | BRITISH AND IRISH ORTHOPTIC SOCIETY

Visual Perception Defects following Stroke or Brain Injury



What is a visual perception defect?

When we look at something, our eyes receive visual information about the object. This information must then be processed by our brain to find out what it means. This enables us to recognise colours, someone we know, or familiar objects. This process can be affected by a stroke or brain injury.

Following a stroke or brain injury, a person may also experience a change in their awareness and perception of the world around them. Both these effects are visual perception defects. There are many types of visual perception defects that can be seen following a stroke or brain injury, some of which will be described in this leaflet.

You might also want to read our leaflet on ‘visual inattention following stroke or brain injury’. The leaflet on visual inattention describes a disorder which can reduce your ability to look, listen or make movements towards one half of your environment.

Types of visual perception problems and their treatments

Visual hallucinations

What is it? – Visual hallucinations are quite common after a sudden loss of vision and are sometimes referred to as Charles Bonnet Syndrome (CBS). The visual hallucinations experienced in CBS may be relatively simple e.g. patterns or lines which can form in to more complicated patterns such as brickwork, netting, mosaic or tiles. Some people experience more complex hallucinations such as seeing people, animals and places. Sometimes whole scenes will appear, like landscapes or groups of people, some of which are life size or others reduced or enlarged in size.

We do not fully understand what causes this condition, but it is often described as the brain ‘filling in the missing parts of vision’. This condition is often described as being similar to ‘phantom limb’ where people who have had a limb amputated may still feel their fingers or toes or experience itching of an arm or leg that is no longer there.

Hallucinations tend to happen when there is not much going on, in low lighting, when people are sitting quietly alone or when a person is lying in bed at night.

Hallucinations are often noticed after stroke or head injury if there has been a loss of vision to one side, hemianopia (please see separate leaflet on ‘visual field loss following stroke or brain injury’). The hallucinations appear on the side of the vision loss but in most cases resolve completely.

An example of the visual hallucinations a person with hemianopia may experience

Treatment – There are no specific treatments for CBS however there are various strategies which can help you cope with these episodes. These include:

- change your activity i.e. if sitting, stand up and move around
- blinking
- closing and opening your eyes
- switching a light on and off
- looking at, or walking away from the hallucination
- talking to, or shouting at the hallucination
- talking to others about your experiences

A small number of people, who find this condition seriously disturbing, may benefit from medical treatment. If you are having problems, talking to your GP / hospital doctor may be a good way to help.

Identifying visual hallucinations and understanding their cause can be reassuring for people suffering from them. Early recognition and reassurance will reduce any distress or suffering experienced by most people, helping them come to terms with it. For many people, the problem improves in time.

Cortical blindness and Anton’s syndrome

What is it? – Patients with cortical blindness or blindsight will tell you that they cannot see but subconsciously some visual information is still processed. For instance, despite not being able to tell you there are obstacles on the road, they can be very skilled at avoiding them. This is due to subcortical pathways still being intact, and so processing happens on an unconscious level. Patients with Anton's syndrome have the opposite problem: they are unable to see but are not aware of this. Additionally, patients may present false memories of things they've seen despite them not being there. Essentially, patients may self-report that they are not blind despite evidence from CT scans.

Treatment – It is not uncommon for these conditions to improve over time. Patients might notice difference in light and dark after a while, however full recovery is unlikely.

Visual agnosias

What is it? – People with visual agnosia have difficulties recognising familiar objects. When looking at it, a person can no longer work out what an object is or what it is used for. There are different kinds of agnosia. Some people might still be able to describe objects clearly and notice all the details. They might even be able to make a very good drawing. However, they can no longer come up with the name of the object. This is known as **optic aphasia**. If these people are shown a picture of a boot, they may wrongly identify it as a hat. However, if you asked them to demonstrate how to use this object, they could correctly describe putting a boot on. When people also no longer know how to use an object they are looking at, it is called **associative agnosia**.

Other people even find it hard to describe what objects look like. They might recognise colours, see straight and curved lines, but cannot put this information together to make up an object. For instance, in the picture below, they might see something roundish, something green, something straight, something thin, something shiny, but not bring all of this information together in one object, an apple. This is especially difficult when there is a lot to see in the background, like in this picture. This is called **apperceptive or integrative agnosia**. For these people drawing and recognising objects is very difficult. Besides a busy background, there are other things that can make recognising objects more difficult. For instance, when things are viewed from an unusual angle (e.g. a cup that has fallen on its side is harder to recognise than an upright cup), or objects are unfamiliar (e.g. recognising gardening tools is harder for someone who doesn't often do gardening).

Treatment – Visual agnosias can improve within months of a brain injury, independent of treatment, as changes in the brain are constantly happening however in many instances visual agnosia does remain after the initial recovery period. Treatments are incredibly individualised and focus on the person's individual strengths and weaknesses to make managing symptoms easier. These can include:

- speech and language therapies
- using other senses such as touch or hearing to help with recognition of objects
- labelling objects around the home that they regularly use
- keeping everyday things like toothbrush, remote control, kettle, phone, keys in the same place
- showing objects on their own and on a plain background without clutter around

Achromatopsia

What is it? – Achromatopsia refers to the difficulty in recognising colours, when this was not previously a problem. The difficulties with colour can vary quite a lot between people and it is estimate that 22% of people who had a stroke have problems with seeing colours. Some people lose all colour vision and see the world in different shades of grey after a stroke. For other people, colours become duller and more faded. More common is to still see most colours but have difficulties telling similar colours (or hues) like green and yellow apart. Difficulties can be restricted to either the left or the right side or can cover on both sides.

Treatment – Since there is no cure, managing symptoms is advised strategy. This can be done by:

- Asking others to point out the colours of things
- Wearing red tinted or darker tinted lenses to help with light sensitivity
- Other technology for example smartphone apps that can help identify the colours of things

Motion-based conditions

What is it? – Someone with **akinetopsia** cannot detect motion or movement but can see stationary or still objects easily. They may see static pictures instead of a series of coherent movements as if their vision was a motion picture that had not been sped up. This means that when something or someone approaches them, they might not notice because to them it looks like the person was first at a distance and then suddenly jumped in front of them. Similarly, when they drop something, they might not see it falling: one moment it is in their hands, the next moment it is on the floor.

A person with **Riddoch's syndrome** has the opposite experience: moving objects are easier to see than static objects. For someone with palinopsia (visual perseveration) an object stays in view, even when they have looked away from the object. It may stay in view for seconds or minutes later, despite no longer being visible and can cause significant confusion.

Treatment – With both of these motion-based conditions, the advice is usual to manage the symptoms, and this could include:

- Visual rehabilitation
- Learning to rely on other senses such as hearing or touch to estimate distance and interact with the environment
- Mobility training to help with mobility skills and navigating safely and independently
- Moving one's head or using a rocking chair to make objects move and come into sight (for Riddoch's syndrome)

Reading difficulties

What is it? – People with **pure word blindness or alexia** can no longer read despite being able to see the text. You can compare it to looking at a text written in a foreign language, maybe even in unfamiliar characters like Mandarin or Arabic. You can identify the characters and the text, but you would not know what it meant. Reading music might also be affected in people with alexia. Some people might still be able to read but do so very slowly and might have to spell out most of the words, just like someone who is learning to read. Unusual words are usually more difficult to read for them.

People with **neglect dyslexia** consistently make errors on either the left or right side of a word. For example, a word-level reading error could mean that they read the word ‘blend’ as ‘lend’. Such difficulties are fairly common. A recent study showed that 61% of people who had a stroke have more difficulties with reading than people of similar age who did not have a stroke (Balani & Bickerton, 2023).

Treatment – Treatment for any alexia or reading problems after stroke are highly individualised and will tailor uniquely to a person. Some methods that have been used include:

- Speech and language therapy where they can practise sounding out letters phonetically, naming letters individually, and pairing a written word with a corresponding picture
- Using audio books
- Using technology to scan text and read it out loud
- Cover lines of the text that they are not reading with a blank sheet of paper
- Follow words with their finger while they are reading
- For some people, it helps to highlight the margin
- Let the bottom edge of the book rest on the table and raise the top edge of the book rather than putting the book flat on the table
- On your computer, use accessibility tools. For instance, it might help to change the font of the text (e.g. Comic Sans and Arial are easier to read), increase the font size, increase the spacing between letters and words, or change the colour of the text and background (black text on yellow background or yellow text on a blue background). In Word, the ‘Immersive Reader’ on the ‘View’ ribbon does a lot of that for you.

Prosopagnosia

What is it? – Prosopagnosia of face blindness is an inability to recognise human faces. People with prosopagnosia know that they are looking at faces but cannot recognise the person by the sight of their face, sometimes even people who they know well or their own face in a photograph or in the mirror. Recognising people can be especially difficult when meeting them in unexpected places, like seeing their doctor in the supermarket. A possible explanation for prosopagnosia is that the brain can no longer match up a mental image of a person’s face what the

face they are looking at. Some can still recognise highly familiar faces but find it hard to differentiate between strangers and people they know, do not recognise emotions, age or gender.

Treatment – What might help:

- Explaining the condition when meeting new people so you can avoid unpleasant situations when you don't recognise them the next time. You can request a badge and card from Face Blind UK to carry with you and show other people that you have difficulties with recognising
- Arranging to meet people in specific places and asking them to approach you
- Asking people you meet regularly to wear a specific piece of clothing all the time that helps you to recognise them (e.g. a distinctive lipstick, hat, scarf, or hair style)
- Asking people to introduce themselves verbally
- Asking people to use words to explain what they are feeling, such as whether they are angry or sad
- Using other cues to recognise people such as their voice or their body language
- Using name tags or writing down where people sit at work
- Asking people you are close to for help identifying others

Metamorphopsia

What is it? – Metamorphopsia is a distortion or change in the shape or size of an object and can occur after a stroke or brain injury. Objects can appear to be bigger or smaller than they really are, or can look distorted in shape.

Treatment – There are no specific treatments for metamorphopsia however some of the suggestions above might help such as using other senses.

Simultanagnosia

What is it? – Someone with simultanagnosia finds it hard to perceive more than one object at a time. They can focus on individual aspects of a picture or scene but cannot view it as a whole. When shown multiple line drawings overlapping, they will often only notice one. People with simultanagnosia have little control over what they can see when and objects can quickly disappear for them when their attention is moved elsewhere. I can feel as looking at the environment with a moving spotlight. In a daily life, people have most difficulties when there is a lot to see like in a supermarket or on the street. In wide-open spaces like the beach or countryside I can be a lot easier to perceive the environment.

Treatment – Managing this visual perception issue is key and some examples of this can include:

- Sticking to a routine, keeping things in familiar places will make them easier to find regardless of whether you are able to see them
- Relying on other senses
- Open spaces might be easier
- Decluttering spaces so there is less visual stimulation to distract you

Driving and visual perception defects

Initially following a stroke, you are not permitted to drive for at least one month. This may be longer if you have had surgery or other complications.

If you have a persistent visual problem such as visual perception difficulties the DVLA states that you are not normally accepted as safe for driving. Your orthoptist and / or therapy team will be able to offer advice on whether you are eligible to return to driving.

A specialist driving assessment may be undertaken if there is any doubt around your driving ability.

If in doubt consult the DVLA website for the latest information: www.dft.gov.uk

Where can I find more information about visual perception defects?

Additional help and advice is available from:

Esme's Umbrella
www.charlesbonnetsyndrome.uk

Face Blink UK
www.faceblind.org.uk

CVI Scotland
www.cviscotland.org

British and Irish Orthoptic Society
www.orthoptics.org.uk

The Stroke Association
www.stroke.org.uk

Headway
www.headway.org.uk

Royal National Institute for the Blind (RNIB)
www.rnib.org.uk

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This leaflet was made by the Stroke and Neurological Rehabilitation Clinical Advisory Group steering committee in December 2024.

See www.orthoptics.org.uk for more information