

# Visual impairments and problems with perception

A range of complex and specific visual impairments and perceptual problems can compound the difficulties faced by a person with dementia, as Clare Morris explains in this third of her series on communication.

People with dementia may appear in some circumstances to be able to see perfectly well, but bump into furniture, put things in strange places, have difficulty following the television or putting something in the oven, be unable to recognise familiar people, see people and objects that are not there, or believe something to have happened that did in fact not happen. Frustration, irritability, fear, a sense of not being believed and behaviour that carers find challenging, often accompany these symptoms. "Challenging" behaviour should always be seen as an attempt at communication, and it can arise for a number of different reasons (some of which have been discussed earlier in this series). However, it is always worth considering whether there might be an underlying perceptual problem which could help to explain the behaviour.

## Impairments in perception

The majority of people with a diagnosis of dementia will not have access to the comprehensive neurological and neuropsychological testing that can identify the specific and extensive impairments in perception that often accompany dementias where the posterior part of the brain is affected. Due to the extent of damage as the condition advances, it may be difficult to engage the person in testing and identify specific difficulties. Symptoms may not be all or nothing, but fluctuate. The person may not be able to tell us what they are experiencing. It must be difficult to know whether what you are seeing is "real" or distorted or imagined.

Given all the difficulties in pinpointing specific impairments of vision and perception in a complex syndrome such as dementia, the most constructive way forward is to develop an awareness and understanding of the various ways a person can be affected, and to bear these in mind when observing their interaction with the environment. This understanding greatly extends our repertoire of "educated guesses" as to the circumstances in which a difficult, puzzling, or challenging behaviour does in fact make sense. This in turn frees us to be flexible and creative in our interventions, finding solutions that work, which brings relief to the person with dementia, their family, and the formal caregiver.

In the first instance it is important to make the distinction between peripheral vision, the perception of stimuli, and images generated in the brain in the absence of stimuli. While it may not always be possible to distinguish these in the context of a dementia, and there may well be an overlap, there will be differences in how they are experienced and differences in the principles behind any intervention.

Peripheral vision is related to acuity, which is the ability to see small objects clearly, and affected by the workings of the eye itself. Acuity changes with age, and can be affected by various pathologies outlined below.

Perception is achieved in the back of the brain (the occipital and parietal lobes). Sensory information from the nerve endings in the eye is processed in stages, each of which can be specifically damaged, causing a variety of difficulties in recognition.

Hallucinations and delusions are images and beliefs experienced by a person in the absence of any external stimuli, therefore generated independently within the brain. These will be discussed in Part 4 of this series.

## Changes in vision with age

The percentage of light entering the retina decreases with age: by the age of 60 years only one third of the light received by a 20-year-old reaches the retina, due to narrowing of the aperture of the pupil as a result of the ageing process. The speed and efficiency with which the eye adapts to low light conditions therefore reduces with age.

Visual acuity is reduced by 10 per cent in 60-69 year olds, by 30 per cent in 70-79 year olds, and by 35 per cent in the over-80s. This is due to the gradual loss of lens elasticity, making it more difficult for the eye muscles to alter the shape of the lens. The ability to perceive depth is affected, and focusing on near objects becomes impaired, causing the long sightedness common in people over 45 years of age.

The field of view is reduced progressively with age, to such an extent that an elderly person can sit next to someone and be unaware of their presence.

Adequate lighting, the strategic use of colour (reds and yellows will be seen much more easily than dark colours),

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positioning of furniture and attention to the way we communicate are therefore increasingly important considerations as people become older. Attention to these issues becomes crucial for the person with dementia who, due to difficulties with processing information generally, may fail to recognise their disabilities and be less able to compensate for them.

### The effects of disease

There are a number of diseases of the eye that affect peripheral vision:

- *Macular degeneration of the retina* is a common cause of blindness in elderly people. The macula is the most sensitive part of the retina which receives light for vision. It is critical for tasks requiring fine visual discrimination, such as reading.
- *Cataracts* cause the lens of the eye to become increasingly opaque, blocking more and more light from entering the eye and leading to a corresponding deterioration in vision.
- *Glaucoma* is caused by a rise in the fluid pressure inside the eyeball which compresses the optic nerve. This is a treatable condition when detected sufficiently early, but causes blindness if untreated.
- *Diabetic retinopathy and inflammation or tumours of the optic nerve* are other causes of peripheral visual problems.

### Drug-induced problems

Neuroleptic medication may have side-effects. For example it can cause accommodation paresis (paralysis of the muscles which constrict and dilate the pupils) which results in blurred vision for close

#### Missing information

Edna used to hit out with her unparalysed arm whenever approached. Aged in her seventies at the time, she was confined to a wheelchair which she was unable to operate herself. With age, the field of view deteriorates significantly, consequently two elderly people sitting next to each other may well be unaware of each other's presence. Likewise hearing deteriorates, causing difficulty hearing people approach and difficulty localising sound.

Perhaps Edna did not hear nor see anyone approaching, but reacted reflexively to defend herself when she was grasped under the arms to reposition her after she had slipped forward in her wheelchair? This hypothesis was adopted: staff were encouraged to approach Edna from the front, and to alert her to their presence both verbally and through cautious touch if she was asleep. Following this change in practice Edna was sometimes verbally aggressive, but she never hit out again.

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objects. This could be one explanation for the phenomenon where people with apparently poor vision can still identify people at a distance.

#### Colour blindness

The most common form of colour blindness is due to the absence of specific nerve endings which recognise the colour red, making it impossible for the person to distinguish red from green. The disability is so slight many people are unaware of their condition unless specifically tested for it. How do you know you are not seeing a "true" colour?

#### Visual field deficits

If someone has a visual field deficit, part of their field of view is missing. For example, when looking at a row of people some of those people will not be seen at all. This is a common problem after a stroke, when perhaps half or a quarter of the field of view can be affected. In practice, people and objects in the person's environment may not be seen, and some people may be better than others at compensating by moving their head to bring blind spots into view. Compensating in this way and making sense of the result might well prove more difficult for someone with information processing problems such as in dementia.

#### Visual inattention/neglect

This problem affects one side of the visual field. Despite adequate vision, the person fails to notice anything on the affected side. For example the person only eats food from one side of the plate and bumps into furniture on one side. This commonly occurs after a stroke affecting the right side of the brain (causing left arm and leg weakness and visual neglect of the left side).

### Difficulties in recognition

#### Agnosia

Agnosia is, broadly speaking, an inability to recognise stimuli (eg objects, people, noises) although the sensory system concerned is not impaired. It can affect any sensory system: touch, taste and smell, hearing and vision. While visual agnosia will be focused on here, with all forms of

agnosia the principle of using "multiple sensory channels" will serve to compensate for the disability in many situations. Changing the way an object is presented to a person with visual agnosia will not improve their ability to recognise it. In the case of auditory agnosia however, where speech is perceived as nonsense, slowing the rate of your communication can help understanding.

In the context of dementia we must always be aware that multiple systems are likely to be affected, and we need to be aware of overloading systems as well as boosting them. Pamela (see box on p.28) talks of being unable to do two things at once, that is listen to instructions to help her visually, while trying to puzzle out what she is seeing. It takes all her energy to process either visual information or speech, and both tasks separately are very tiring.

#### The visual agnosias

Visual agnosia is the inability to recognise something by sight alone, despite an intact peripheral visual system. Recognition may be possible when the object is touched and handled, providing there is no tactile agnosia.

Through neuropsychological research, a great deal is now known about the syndrome of visual agnosia, which can arise from damage to different stages of visual perceptual processing. These stages have been identified by testing people with specific neurological impairments. Difficulties with some tasks but not with others have shown there to be at least three stages in achieving perception, and also different "routes" to achieve the same thing. Damage to different stages gives rise to different disabilities, but in dementia the processing may be affected at multiple stages and in multiple systems, for example perception and language and memory are affected. There are three main stages of object perception:

- *Early visual processing* is the first stage of perceptual processing. It is unrelated to acuity, and identifies the two-dimensional shape, form and position of an object, allows us to distinguish figure from background and the boundaries or edges of an image. Problems at this stage of processing are very disabling. Visual problems will be obvious but difficult to understand because in terms of acuity the person may be able to see. It does not help at all if the

John's wife complained that she would ask him to pass something on the breakfast table and he appeared not to recognise it – when handed to him or pointed out he seemed to understand. On one occasion she found him trying to shave with his walkman.

**Information overload**

Pamela is a woman in her sixties who attended counselling both alone and with her husband. She has severe early visual processing problems causing widespread difficulties with daily living. At an early stage of her Alzheimer's disease, both Pamela and her husband were able to benefit from the understanding gained from her neuropsychological profile, in order to try and alter their habitual ways of communicating to compensate for her difficulties.

Pamela is unable to recognise any faces, and recognises people she knows by their voice and their clothes. She cannot make sense of pictures, which affects her ability to recognise tins of food reliably. If she is methodical about keeping things in the same place, facing the right way, in a manner you could call obsessive, she can begin to compensate for her disability. It was very important for her family to recognise this in order not to increase her disorientation, and prevent arguments caused by her "unreasonable" expectations for orderliness. It was essential to explain the difference between seeing things and the ability to make sense of what she sees. It does not matter how big something is, it does not help; the fact that she can spot a tiny piece of dirt on the floor does not mean she is "putting it on".

Other features of her condition are word finding problems, problems with reasoning and thinking clearly, and a difficulty with processing things quickly. Trying to describe to her what to do to get a dish in the oven would make things worse because doing two difficult tasks at once overloads the system, escalating the problem. People with dementia, particularly in the early stages, put an enormous amount of effort into making sense of everyday things, while above all trying to appear as if nothing is wrong. Perhaps there is an awareness at some level that the problems are getting worse.

This makes her feel frightened, out of control, and sensitive about her independence slipping away, becoming more and more touchy about depending on others. Helping her family on the one hand to understand her experience and her feelings, and Pamela on the other to appreciate that her condition is difficult for the people around her too, went a long way towards improving the situation.

While the goalposts are always shifting with disease progression, it was of value to Pamela to talk in confidence and feel understood, and most significantly she could see her family attempting to accommodate her disabilities, with an increase in quality of life for all concerned.

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subject is made bigger or brought closer. The person may put ornaments upside down, have difficulty recognising pieces of clothing and which is the front or the back, be unable to make sense of pictures, faces and/or writing, find it difficult to follow television or put a pizza in the oven. The person won't be able to find their way around easily, particularly in unfamiliar surroundings. Objects are often drained of colour, ranging from "watered down" or faded colours to seeing things in black and white.

- *Apperception* is the stage of conscious awareness of a sensory impression. The three-dimensional properties of an object or image are coded in the brain, specifying details of volume and geometry. It is a visual representation without all the features present - known as a "percept". A person with problems at this level may not complain of visual problems, but have difficulty seeing or perceiving *objects* correctly. This aspect of visual processing is linked to memory.

- *Associative*: At this stage the three-dimensional sensory impressions (the content of *apperception*) are processed for meaning. A person with problems at this level will be able to *perceive* objects normally, but does not know what they are for. Unpacking the shopping will be very difficult because the person will not know to put the butter in the fridge, the ice cream in the freezer, and the tins in the cupboard. They may think a certain object is something quite different.

**Visuo-spatial perception**

The "three stages of processing" model applies equally to visuo-spatial perception, that is knowing *where* something is as opposed to *what* it is:

- *Visual disorientation*

Visual disorientation is where a person has no difficulty perceiving or recognising something for what it is but cannot locate it in space (a failure of "point location"). The person has problems knowing whether something is to the left or right, lower or higher, nearer or further away. They will mis-reach, have difficulty putting a cup on the saucer, and pour tea onto the table instead of in the cup. The person will appear blind when walking across the room, unable to identify where the chairs are in relation to themselves.

- *Visuo-spatial agnosia*

A problem at this stage of processing is equivalent to apperception: the person cannot construct a spatial plan or map. For example when trying to lay the table, the person will be unable to put knives, forks, spoons, etc in their correct places.

- *Topographical memory loss*

Impairment at this level causes difficulty with remembering routes. The person can no longer find their way to Sainsbury's although they can recognise their own house or Sainsbury's when they get there.

**Anton's syndrome**

Anton's syndrome is a cortical blindness associated with dementia and delirium where the person denies any difficulty with seeing. It is not a question of deceit; the person thinks they can see. Some image is perceived, but it is not properly formed.

**Illusions and misperceptions**

We all experience illusions - for example have you ever pointed out a pattern in the fire, or a cloud that resembles an animal or someone you know? In Southern Iceland there are cliffs on the coast that are so textured you can see monstrous "faces", and intricate folk tales about the trolls that inhabit the area have a long history in the island's culture. As a child, did you ever imagine "monsters" or "intruders" when lying in bed in the half light? The person with dementia may often misinterpret what he or she sees.

Misperception and visual agnosia may well in some cases be implicated in the development of delusions in people with dementia. This will be considered in the next part of this series, along with the experience of hallucinations.

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