



Robert Orchardson

Aphasia – The Hidden Disability

Abstract: Aphasia is an acquired language disorder due to brain damage and which may include difficulty in producing or comprehending spoken or written language. Stroke is the commonest cause and each year 50,000 new patients develop aphasia. People with aphasia differ in their speech output and in their fluency. Some people communicate reasonably well, while others have very limited powers of expression. This review will describe the neurology of speech and aphasia, and will focus on the role of the speech and language therapist in dealing with people with aphasia.

Clinical Relevance: Dentists and their staff should be aware that after a stroke some people are unable to talk or have limited powers of expression. Comprehension might be impaired and people with aphasia may be unable to grasp some common language, such as appointment letters and patient information.

Dent Update 2012; 39: 168–174

I was Senior Lecturer in the Oral Biology Department of Glasgow Dental School; I was Postgraduate Convener and deputy course organizer for the 1st BDS. Then, in January 2009, I had my stroke.

I was washing one morning when I had my stroke. I was conscious and remember the journey to the hospital. The right side of my body was paralysed and numb. I could not speak, but I was fully aware of my surroundings. Now, 3 years on, I have survived my stroke and I want to tell my story. I can now speak so people can understand. I can respond to better than I can initiate conversation. Sometimes, the wrong words come out, which I recognize. Writing is a strain, but given time, I get there – witness this paper!

Most will have heard of the paralysis, numbness, or visual problems but fewer will have heard of aphasia.¹ Code and co-workers² surveyed 929 people in England, USA and Australia to determine what they knew about aphasia. Fewer than 18% said they had heard of aphasia, but only 2–7% had some basic knowledge of aphasia. More recently, in 2008, a GfK NOP survey³ revealed over 90% of people in the United Kingdom had never heard of aphasia. The Aphasia Alliance coined

Condition	Prevalence / Incidence	Source
Diabetes	2.8 million patients in the UK Type 1: 280,000 patients Type 2: 2,520,000 patients	www.diabetes.co.uk
Alzheimer's disease	465,000 patients in the UK	www.alzheimers.org.uk
Aphasia	250,000 patients in the UK 50,000 new patients each year	www.aphasiaalliance.org.uk
Parkinson's disease	120,000 patients in the UK 10,000 new patients each year	www.parkinsons.org.uk
Multiple sclerosis	100,000 patients in the UK 2,500 new patients each year	www.mssociety.org.uk
Cerebral palsy	2,000 new patients each year	www.NHSchoices.co.uk
Motor neuron disease	5,000 patients in the UK	www.mndassociation.org

Table 1. Specific disorders in the general population (prevalence and incidence).

the term 'Aphasia – the hidden disability';³ this is because there is no visual sign that someone with aphasia has a disability.

Nomenclature

The term 'aphasia', or the older term 'dysphasia', is used to identify the disorder of the use of words or symbols.¹ Also, the

term 'dysphasia' is easily confused with 'dysphagia', a swallowing disorder, and thus 'aphasia' has come to mean both partial and total language impairment. The term aphasia encompasses failure to understand the spoken or written word as well as inappropriate use of words, or the production of made-up words due to sound-choice errors. Aphasia is distinguished

Robert Orchardson, BSc, BDS, PhD, FDS RCPS(Glasg), Retired Senior Lecturer in the Oral Biology Department of Glasgow Dental School.

Type	Site of lesion	Fluency	Comprehension	Naming	Repetition	Reading
Broca's	Inferior frontal gyrus, insula and underlying white matter (Brodmann area 44 and 45)	Poor, effortful speech	Intact words and simple sentences	Worse for verbs	Fair/poor	Fair/poor
Wernicke's	Posterior end of superior temporal gyrus and underlying white matter (Brodmann area 22)	Empty and does not convey meaning	Empty and does not convey meaning	Worst for nouns	Poor, fluent jargon	Poor
Conduction	Left arcuate fasciculus and supramarginal gyrus	Fair/good	Intact words and simple sentences	Fair/good	Fair/good	Good
Global	Large infarction of left cerebral hemisphere	Poor	Poor	Poor	Poor	Poor

Table 2. The perisylvian aphasias.^{1,7}

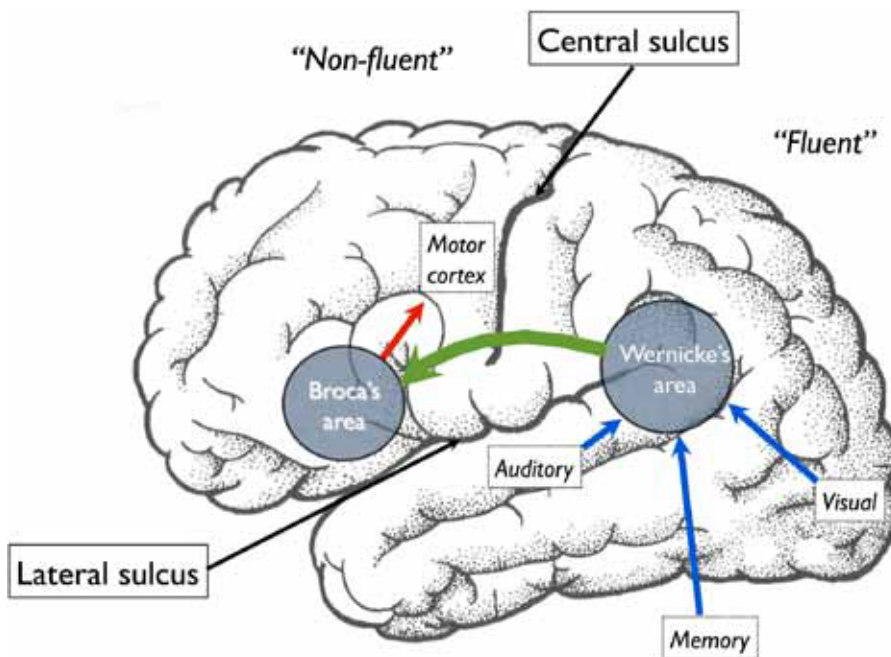


Figure 1. The left hemisphere of the brain showing the sequence of events in speech. The 'input' side comprises auditory, visual and memory (blue) and Wernicke's area. Wernicke's area connects to Broca's area via the arcuate fasciculi (green). Broca's area is the 'output' side to and connects to the motor cortex (red). The 'fluent' and 'non-fluent' aphasias correspond roughly to either side of the central sulcus. The lateral sulcus (or Sylvian fissure) is also depicted.

may include difficulty in producing or comprehending spoken or written language.⁵ There are approximately 250,000 people living with aphasia in the UK and 50,000 new people each year develop aphasia (Table 1). Aphasia is more prevalent than Parkinson's disease, multiple sclerosis, cerebral palsy, and motor neuron diseases. In contrast, the prevalence of Alzheimer's disease is greater and diabetes very much greater (Table 1).

Although males have a higher incidence of stroke, females are 1.5 times more likely to die of stroke. Age is likely to be important as the plasticity of the brain decreases with age. The number of patients with language disorders secondary to traumatic brain injuries, brain tumours and brain lesions, such as arteriovenous malformations, are not precisely known.⁵ Patients with neurodegenerative disorders, such as Alzheimer's disease, frequently manifest language deficits.⁵

Pathophysiology

Language function is related to the left hemisphere of the brain in 96–99% of right-handed people and 60% of left-handed people.⁵ Of the remaining left-handed people, about one half have mixed hemisphere language dominance, and about one half have right hemisphere dominance.

Language function is complex and involves many different brain regions functioning together. On the input or receptive side, there are several modalities.

from 'dysarthria' in which speech is employed correctly but articulation is faulty because of neuromuscular problems.¹ The term 'apraxia' results from an inability to integrate components of a complex action. By definition, there is no defect of power, co-ordination, sensation, attention or comprehension.^{1,4} Apraxia is often associated with Broca's or conduction aphasia (see below). Patients with

Broca's aphasia (see below), with or without co-existing apraxia, can live independently, take public transport or drive, and lead a relatively normal life.⁴

Facts and figures

Aphasia is an acquired language disorder due to brain damage, and this

Using the telephone
 Making appointments
 Following written instructions, eg oral hygiene instruction
 Understanding prescriptions and medications
 Completing medical history forms
 Understanding complex verbal information and jargon

Table 3. Some incidences that people with aphasia may find particularly challenging.

The auditory cortex (hearing), visual cortex (sight), and hippocampus (memory) feed into Wernicke's area (Brodmann's area 22) (Figure 1). Connections exist from Wernicke's area to Broca's area via the arcuate fasciculi.⁶ The anterior language area (Broca's area; Brodmann areas 44 and 45) is the posterior two-thirds of the inferior frontal gyrus operculum, and is the first step of output or expressive side. Broca's area feeds to the motor cortex controlling the vocal tract. Figure 1 summarizes the left hemispheric events in language function.

Classification

There are several different types of aphasia. The perisylvian aphasias are located in the tissues surrounding the Sylvian fissure (or lateral sulcus) (Figure 1) and are Broca's, Wernicke's, conduction and global aphasia. Table 2 itemizes the main features of the perisylvian aphasias.

In contrast, in the transcortical and subcortical aphasias, the primary lesion does not involve the language cortex and related subcortical structures. The non-perisylvian aphasia includes anomia, transcortical motor, transcortical sensory, optic, subcortical aphasia, and thalamic aphasia.⁷ The transcortical aphasias refer to language syndromes similar to those described in Table 2, but with relatively normal sentence repetition.⁷ Space does not permit detailed discussion of the non-perisylvian aphasias. Also, patients who have had a stroke may evolve from one type of aphasia to another as they recover.⁵

Aphasia may also be grouped according to the speech as 'fluent' and 'non-fluent' (Figure 1). Disorders of the 'input' or afferent side generally produce a fluent aphasia.

Speak naturally and stay calm when talking.

Talk with a normal voice, but at a slightly slower speed than usual.

Maintain a natural conversation manner appropriate for an adult.

Use short, uncomplicated sentences and do not change the conversation too quickly.

Avoid asking open-ended questions (open questions). Questions that only have a 'yes' or 'no' answer are better (closed questions).

Avoid finishing a person's sentence or correcting any errors in their language. This can cause resentment and frustration for the person with aphasia.

Try to keep any possible distraction to a minimum, such as background radio or television noise.

Be open to different ways of getting and sending messages, eg drawing, diagrams. Don't forget non-verbal communication. Write down any key words or concepts to help reinforce your message.

Try to remember that, despite their change in speech pattern, the person's personality is unchanged. They may appear emotionally distant or abrupt but how they speak to you does not necessarily reflect how they feel about you.

Table 4. Communicating with a person with aphasia. Before you start to speak make eye contact.^{12, 16}

These are produced by lesions posterior to the central sulcus, eg Wernicke's aphasia. The speech is well articulated but meaningless.⁷ This is because the normal, afferent or receptive input to the system (auditory, visual, or memory) is not functioning. Patients with Wernicke's aphasia are not always aware of the deficits and, over time, they may become frustrated that others do not understand them.

The non-fluent aphasia is due to a lesion on the 'output' or efferent side, eg Broca's aphasia; in this case, the posterior two-thirds of the inferior frontal gyrus and surrounding white matter. The 'input' side is by and large intact, but the 'output' or expressive side is affected. In Broca's aphasia, speech is limited and poorly articulated.⁷

Treatment

There are several reviews of stroke^{5,8,9} and dental treatment of patients with stroke,¹⁰⁻¹² and readers should consult these sources.

Speech and language therapy (SLT)

Speech and language therapy (SLT) is the mainstay of continued care for patients with aphasia. Treatment starts as early as possible, often within days of being admitted to hospital. If required, SLT will continue when

the people who have aphasia get home.

Timing and nature of the interventions for aphasia vary widely. Patient difficulties vary, and individualizing programmes is important. Recent studies have shown intense treatment, several hours a day, several days a week, is more effective than a similar number of shorter sessions spread out over a longer period.¹³ In reality, most people with aphasia are limited to one or two sessions per week, owing to man-power shortages.

Psychological support is also important.⁵ People with aphasia can often undergo social isolation, as their self-confidence is devastated by losing their ability to communicate – something that most people take for granted. Table 3 gives some incidences of difficulties that people with aphasia may experience.

Code and co-workers¹⁴ concluded that the emotional impact of aphasia can have a pronounced effect on recovery. People with aphasia may experience clinical depression and therapies like Cognitive Behavioural Therapy or drugs may be used.

Law *et al*¹⁵ reported on *The Aphasia in Scotland* survey, which compared the responses of practitioners (SLT) and the service users (the people who have got aphasia). One of the most striking concerns expressed by both those with aphasia and the aphasia

Member	Website	Advice/Helpline
British Aphasiology Society	www.bas.org.uk	-
Chest, Heart and Stroke Scotland	www.chss.org.uk	0845 077 6000
Connect	www.ukconnect.org	020 7367 0840
Different Strokes	www.differentstrokes.co.uk	0845 130 7172
Dyscover	www.dyscover.org.uk	01737 819419
North-East Trust for Aphasia	www.neta.org.uk	0191 222 8659
Royal College of Speech and Language Therapists	www.rcslt.org	020 7378 1200
Speakability	www.speakability.org.uk	080 8808 9572
Speakeasy	www.buryspeakeasy.org.uk	01706 825802
Stroke Association	www.stroke.org.uk	0303 303 3100
Tavistock Trust for Aphasia	www.aphasiatavistocktrust.org	01525 290002

Table 5. The Aphasia Alliance members.

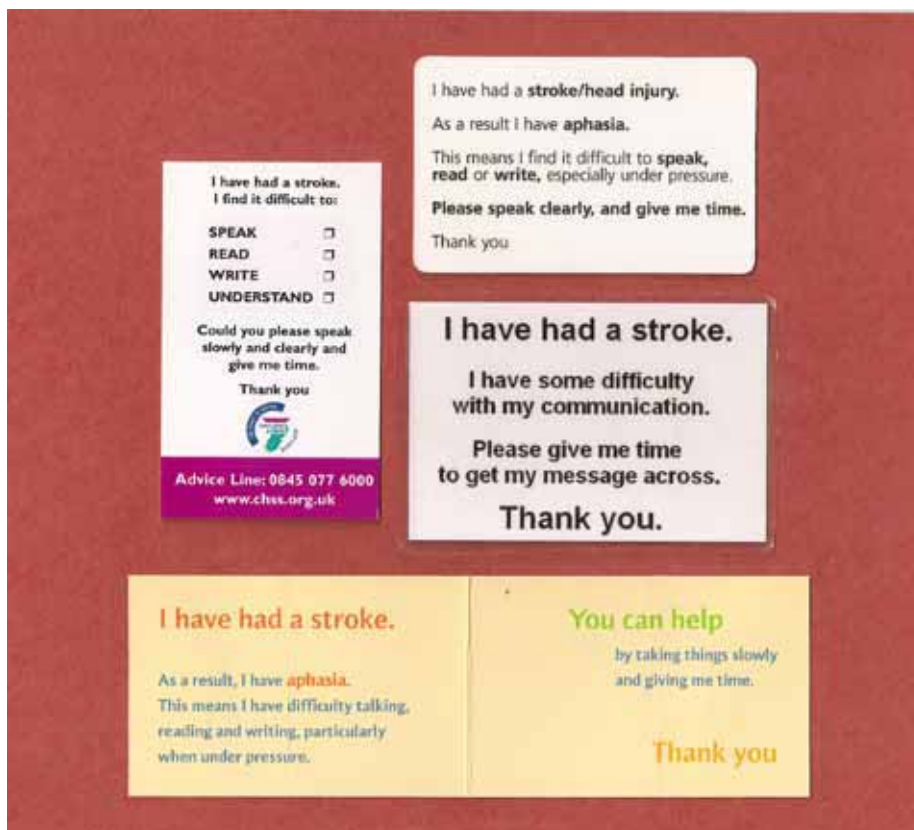


Figure 2. Some of the ID cards designed to facilitate communication for people with aphasia.

professionals was the lack of public and professional knowledge about aphasia.¹⁵ A number felt that hospital nursing staff often did not know about aphasia, or were too busy with their other duties to dedicate time for facilitating communication

with a person with aphasia.¹⁵ Speech and language therapists also expressed concern about the advent of services like NHS 24 and e-health, which rely on means of communication that people with aphasia could find difficult.¹⁶

Communication with a person with aphasia

All dental personnel should be aware that they may encounter patients with aphasia and should be aware of how to help maximize communication. There are a few tips for facilitating communication and these are given in Table 4.

The Aphasia Alliance is an organization for dealing with aphasia. The members of the Aphasia Alliance range from very small, local charities to large national organizations and the members are listed in Table 5. Some organizations have produced credit card-sized aphasia ID cards, which the people with aphasia can use to help themselves in communicative situations (Figure 2).

Conclusions

Physical symbols, such as using a wheelchair or a white stick, are widely recognized, but 72% of people did not mention those affected by communication difficulties, such as aphasia (GfK NOP). This is worrying. Aphasia is a communication disability, which arises when the language areas of the brain are damaged either by stroke or head injury. Aphasia can affect all ages and the pattern of aphasia is different for everyone. Some people never make a complete recovery.

Acknowledgements

I would like to acknowledge the help given to me by the doctors and staff of

the Southern General Hospital, and Victoria Hospital, Glasgow; I would like to thank especially Sheetal Basi and Rachel Thomson of the Speech and Language Department, Victoria Hospital, Glasgow. I would also like to thank Anne Orchardson for correcting the English.

References

1. Durward WF, Orchardson R, Jones JH. Diseases of the nervous system. In: *Oral Manifestations of Systemic Disease* 2nd edn. Jones JH, Mason DK, eds. London: Bailliere Tindall, 1990: pp.714–746.
2. Code C, Mackie NS, Armstrong E *et al*. The public awareness of aphasia: an international survey. *Int J Lang Commun Disord* 2001; **36**(Suppl): 1–6.
3. Gesellschaft fur Konsumforschung National Opinion Poll; www.aphasiaalliance.org/files/Aphasia-14-04-2008.doc
4. Chawla J, Jacobs DH. Apraxia and related syndromes. www.emedicine.com/article/1136037 (Accessed December 2010).
5. Kirshner HB, Jacobs DH. Aphasia an overview. www.emedicine.medscape.com/article/1135944-overview (Accessed November 2010).
6. Catani M, Jones DK, ffytche DH. Perisylvian language networks of the human brain. *Ann Neurol* 2005; **57**: 8–16.
7. Hillis AE. Aphasia; progress in the last quarter of a century. *Neurology* 2007; **69**: 200–213.
8. Warlow C, Sudlow C, Dennis M, Wardlaw J, Sandercock P. Stroke. *Lancet* 2003; **362**: 1211–1224.
9. Dougall A, Fiske J. Access to special care dentistry, part 9. Special care dentistry for older people. *Br Dent J* 2008; **205**: 421–434.
10. Ostuni E. Stroke and the dental patient. *J Am Dent Assoc* 1994; **125**: 721–727.
11. Fatahzadeh M, Glick M. Stroke: epidemiology, classification, risk factors, complications, diagnosis, prevention, and medical and dental management. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2006; **102**: 180–191.
12. Dougall A, Fiske J. Access to special care dentistry, part 2. Communication. *Br Dent J* 2008; **205**: 11–21.
13. Bhogal SK, Teasell R, Speechley M. Intensity of aphasia therapy, impact on recovery. *Stroke* 2003; **34**: 987–993.
14. Code C, Hemsley G, Herrmann M. The emotional impact of aphasia. *Semin Speech Lang* 1999; **20**: 19–31.
15. Law J, Huby G, Irving A-M *et al*. Reconciling the perspective of practitioner and service user: finding from *The Aphasia in Scotland* study. *Int J Lang Commun Disord* 2010; **45**: 551–560.
16. www.speakability.org.uk/Aphasia+Information/speakability_aphasia_information (Accessed July 2011).