What are SLPs interested in?

where is the damage?	- anatomy
What is the function of the damaged area?	- Areas important for speech and language processing, swallowing
what has caused the brain damage?	- Sudden incident (potential to improve) or progressive disease (symptoms getting worse over time)
What are the language/ speech/ swallowing symptoms?	- What are the signs and characteristics of abnormalities ; Severity

- Different methods for the assessment and investigation of neurologically-based communication disorders

Nervous system

Complex collection of nerve cells (billions)	that transmit signals between different parts of the body - allows you to do things like walking, speaking, swallowing
Structurally – NS has TWO components	Central nervous system (CNS) - Brain (incl. cerebellum & brain stem → image) ▪ Spinal Cord
	Peripheral nervous system (PNS) - Nerves outside of the brain & spinal cord ▪ Connects CNS to limbs & organs
Contra lateral innervation	one side of the brain essentially controls the opposite side of the body

BROCA'S AREA & WERNICKE'S AREA

BROCA'S AREA
Paul Broca
patients who lost the ability to speak
Most had lesions in posterior part of left frontal lobe
in the posterior part of the frontal lobe of left hemisphere
region for expressive language
WERNICKE'S AREA
Karl Wernicke
patients with fluent speech but impaired comprehension
Most had lesions in the superior part of the left temporal lobe
in the superior part of the temporal lobe of left hemisphere
region for receptive language

Anatomy and Function

Brain	➢ Grey matter (nerve cell bodies)
	➢ Wrinkly appearance
	➢ Bumps – gyri
	➢ Grooves – sulci and fissures
Divided lengthways into two hemispheres	➢left & right
FRONTAL LOBE – Function	➢Attention
	➢ Language production
	➢ Voluntary movement
	➢ Behaviour and Personality
	➢ Planning of movement
	➢ Reasoning and problem solving
TEMPORAL LOBE – Function	➢ Hearing e.g., words, laughing, baby crying
	➢ Language comprehension
	➢ Interpret other people's emotions
PARIETAL LOBE – Function	➢ Processing of sensory information e.g., touch, pressure, pain, temperature, taste, position
	➢ Body orientation
OCCIPITAL LOBE – Function	➢ Processing of visual information e.g., in reading, recognising faces/ objects
LANGUAGE AREAS IN THE BRAIN	➢ Left hemisphere
	➢ Frontal lobe (and Broca's area) vital for language and speech production
	➢ Temporal lobe (and Wernicke's area) vital for language comprehension

Grey is the surface – cerebral cortex
Children with soft non wrinkly brains will have intellectual issues

common causes of acquired communication disorders

Sudden incidences are;
➢ Stroke
➢ Traumatic Brain Injury (TBI)
Progressive diseases are;
➢ Alzheimer's disease
➢ Parkinson's disease
➢ Multiple Sclerosis (MS)

Nervous system requires a high blood flow

➢ Brain made up of cells (nerve cells)
➢They are the key players BUT to function properly;
▪ Nerve cells depend on adequate supply of oxygen and nutrients (e.g., glucose)
through a dense network of blood vessels

Brain lesions

Stroke	Rapid loss of brain function due to an injury to blood vessels in the brain
Risk factors -	Overweight - Physical inactivity - Heavy drinking - Use of illegal drugs - High blood pressure - Cigarette smoking - High cholesterol - Diabetes
Blood supply disturbed due to	A clot (Infarct/ Ischemic stroke) - 80%
	Bleeding (Haemorrhage/ Haemorrhagic stroke) - 20%

Brain lesions (cont)

	Blood flow is suddenly interrupted to an area of brain (↓ oxygen & ↓ glucose) → Nerve cells begin to die
Symptoms and effects depend on the lesion site	Vision problems
	Change of behaviour
	Sensory deficits
	memory loss
	speech/language problems
Paralysis/hemiplegia	complete paralysis of half of the body
hemiparesis	weakness of one entire side of the body
If the stroke occurs in the left side of the brain, the right side of the body will be affected, and vice versa	
Traumatic Brain Injury (TBI) - OPEN HEAD INJURY	Sudden damage to the brain caused when the scalp/ skull is broken, fractured, or penetrated
	Damage to brain tissue and blood vessels

Brain lesions (cont)

	Damage is typically widespread or diffuse to an area or areas within the brain
TBI - CLOSED HEAD INJURY	Results when an outside force impacts the head BUT the skull is not broken, fractured, or penetrated
	shaking of the brain inside the bony skull results in bruising and tearing of brain tissue and blood vessels
	Damage is typically widespread or diffuse to an area or areas within the brain
TBI – Symptoms	Effects largely dependent upon location and extent of the brain injury
	Change of behaviour
	Vision impairments
	Sensory deficits
	Paralysis, movement difficulties

Brain lesions (cont)

Swallowing disorders	
Speech and language problems	

Progressive diseases

ALZHEIMER'S DISEASE	Most common type of dementia in older adults
Dementia	progressive deterioration in cognitive functions (e.g., thinking, communication)
	Significant loss of brain volume (nerve cell death)
	Incidence rising with ageing population
Clients with Alzheimer's Disease	Inappropriate social behaviour
	Poor memory
	Problems performing routine tasks
	Problems with abstract thinking and judgement
	Confusion
	Speech, language and swallowing difficulties
PARKINSON'S DISEASE	Degeneration/ death of nerve cells leads to movement & cognitive impairments

Progressive diseases (cont)	
	Occurs in around 1% of the population aged over 60
Symptoms	Tremor (can affect limbs + jaw, tongue, face in some cases)
	Absence of/ Reduced movement
	Muscle rigidity
	Stooped posture
	Dementia (40% cases)
MULTIPLE SCLEROSIS	Demyelinating disease
	▪in which the protective cover (Myelin) of nerve cells in the brain and spinal cord are damaged
	▪ Disrupts the ability of the nervous system to communicate properly (i.e. information transfer affected)
	➢ More common in women 20-40 years old
	➢ Cause not known (genetics & environmental factors such as infections proposed)
Symptoms	vary depending on the lesion sites

Progressive diseases (cont)
Fatigue
Mobility problems
Problems with thinking, learning and planning
Speech and swallowing difficulties