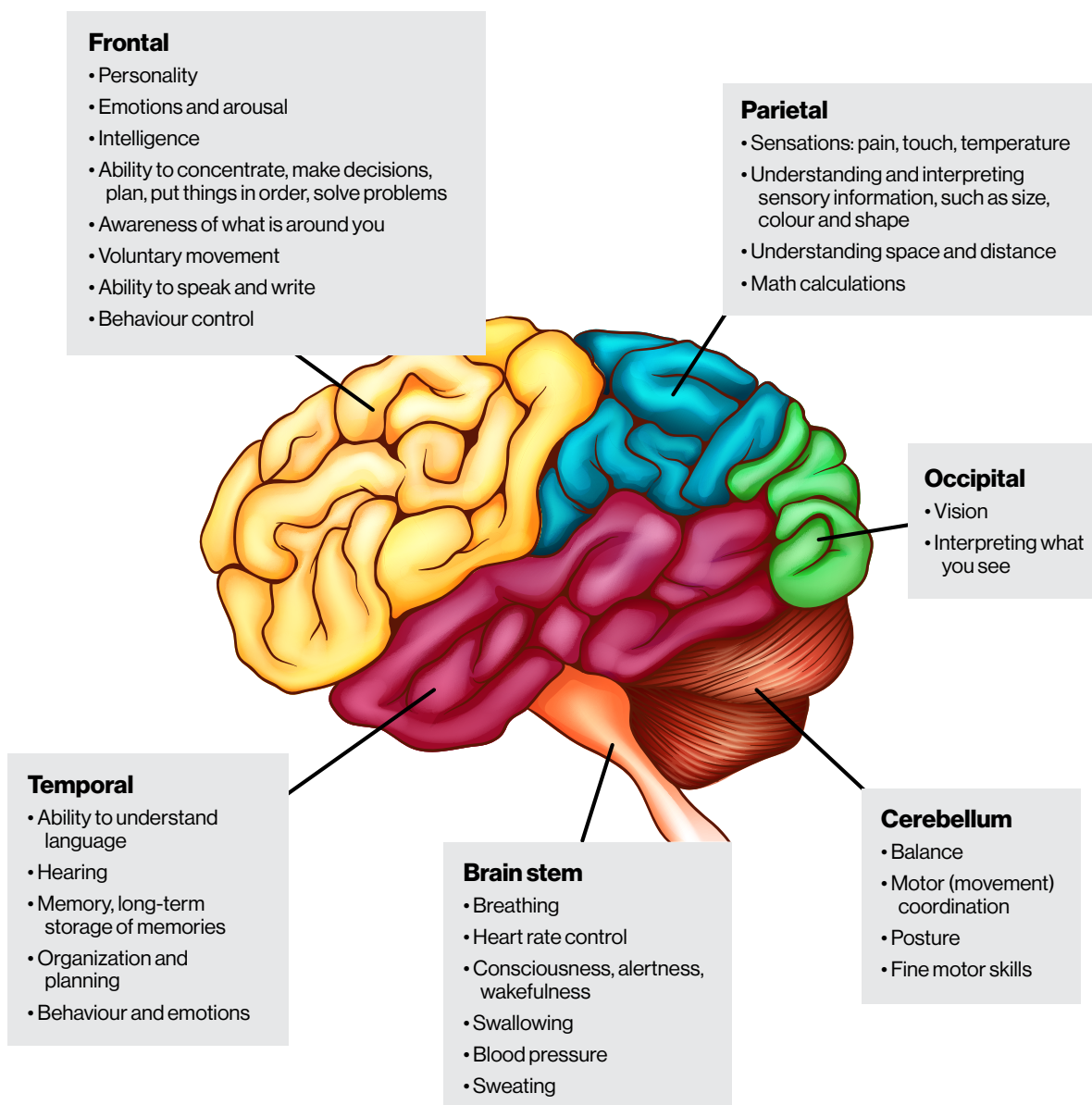


2 Body Structure

2.1 The Brain

There are many considerations that are crucial to promoting safety and optimizing recovery when working with people who have had a stroke. The TACLS Quick Reference Guides were developed from the TACLS resource and can be used as quick reference to help *support healthcare providers* and informal caregivers who may not typically work with and care for people who have had a stroke.

We recommend reviewing the full **TACLS resource** for more complete information:
strokebestpractices.ca/resources/professional-resources/tacsl



Areas of the brain

- The largest area of the brain is called the **cerebrum**, and is divided into two halves called hemispheres:
 - The **left hemisphere** controls the **right side of the body**.
 - The **right hemisphere** controls the **left side of the body**.
- Each hemisphere consists of four lobes that are responsible for different functions.
- The two hemispheres are connected to each other by nerve fibers, allowing the hemispheres to continually communicate and work together.
- The base of the brain has two other major components called the **cerebellum** and the **brainstem**.
- There are other smaller but equally important parts of the brain that are not covered in this document.

How the brain works

- The brain is a complicated organ, and is responsible for a lot of basic and very complex daily functions.
- **Some of the primary functions of the left hemisphere** include different components of movement and feeling on the right side of the body, sight in the right field of vision, language (i.e. spoken and written language), math and number skills, attention to detail, motor planning and sequencing, problem solving, and analytical and rational thought.
- **Some of the primary functions of the right hemisphere** include movement and feeling on the left side of the body, sight in the left field of vision, creative abilities, imagination and intuition, emotional thought, insight, understanding and awareness of nonverbal cues, awareness of and making sense of the surrounding environment (including spatial orientation).
- Each lobe of the brain has different functions. A person's impairments can vary depending on which side of the brain (right or left hemisphere) was impacted by stroke.

Main functions of the brain

Note: See TACLS – The Brain, for additional information.

- **Frontal lobe functions:** important for personality, emotion and mood regulation, cognition (particularly, executive functions), expressive language, voluntary movement, planning and sequencing complex tasks, and urinary continence.
 - **Effects of damage to the frontal lobe include:** loss of movement on the opposite side of the body, emotional and personality changes, trouble expressing oneself through speech and putting thoughts into words, decreased ability to plan, organize and carry out a sequence of complex tasks (apraxia), impaired judgment and problem solving, perseveration (or 'getting stuck') on a single idea or behaviour, and incontinence.
- **Parietal lobe functions:** important for sensation (e.g., touch, temperature, pain), proprioception, visual attention, movement coordination and object manipulation, reading, writing, math, constructing, and naming objects.

- **Effects of damage to the parietal lobe include:** difficulty focusing visual attention, loss of sensation, diminished eye-hand coordination, impairments of body scheme and spatial relations (e.g., difficulty with right-left discrimination, neglecting part of the body or space), aphasia, agnosia, spatial disorientation and navigation difficulties.
- **Temporal lobe functions:** important for hearing ability, understanding language, memory (including storing information, retrieving words and past experiences), integrating sensory information, regulating behaviour and emotions.
 - **Effects of damage to the temporal lobe include:** difficulty recognizing faces, difficulty selectively attending to auditory and visual information, difficulty understanding spoken words (comprehension) and organizing verbal information, short-term and long-term memory loss, altered personality, emotional behaviour, sexual behaviour, impulsiveness, aggressiveness, depression, and persistent talking.
- **Occipital lobe functions:** important for vision, spatial organization and interpretation of visual information, and visual reflexes.
 - **Effects of damage to the occipital lobe include:** deficits in vision (e.g., visual field loss, double vision), inability to recognize familiar objects, words, colour, or movement of an object, difficulty with reading and writing.
- **Cerebellum functions:** important for motor control, maintaining posture and balance, coordination of movement, and muscle tone.
 - **Effects of damage to the cerebellum include:** limb and gait ataxia, difficulty judging distances, difficulty performing rapid movements, dizziness and vertigo, tremors, loss of postural control, balance and coordination, decreased coordination of fine motor movements and slurred speech (dysarthria).
- **Brainstem functions:** important in controlling basic body functions such as breathing, swallowing, heart rate, blood pressure, sweating, regulating sleep/wake cycles, alertness and consciousness, equilibrium/balance, and facial and eye movements.
 - **Effects of damage to the brainstem include:** inability to move eyes in different directions, inappropriate responses to visual or auditory stimuli, altered respiratory, cardiac and blood pressure function, altered taste and hearing, abnormal facial expression, problems with balance and postural control, dysphagia, altered sensation and limb weakness, vertigo, and sleeping difficulties.

References:

1. Canadian Stroke Best Practice Recommendations: www.strokebestpractices.ca
2. Taking Action for Optimal Community and Long-Term Stroke Care (TACLS) – **The Brain**

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