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Back to Basics: Stroke

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Back to Basics: Stroke

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Learning Outcomes

After this course, participants will be able to:

- List three symptoms of stroke
- Identify impact of stroke and associated dysfunction/symptoms on language, swallowing, and cognition
- Identify three functional treatments for survivors of stroke

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Acquired Brain Injury

- “Damage to the brain, which occurs after birth and is not related to a congenital or a degenerative disease. These impairments may be temporary or permanent and cause partial or functional disability or psychosocial maladjustment.” – World Health Organization (Geneva 1996)
- Includes traumatic and non-traumatic causes

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Stroke

- A “brain attack”
- Cerebrovascular accident
- Occurs when blood flow is interrupted to an area of the brain, cells are deprived of oxygen, and cells begin to die (National Stroke Association)
- 5th leading cause of death in the United States
- Each year, nearly 800,000 people experience a new or recurrent stroke
- Largely preventable (80%)



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Stroke

- Ischemic
 - 80% of strokes
 - Thrombotic
 - “A blood clot (thrombus) forms in one of the arteries that supply blood to your brain. A clot may be caused by fatty deposits (plaque) that build up in arteries and cause reduced blood flow (atherosclerosis) or other artery conditions.” (Mayo Clinic)
 - Embolic
 - “A blood clot or other debris forms away from your brain — commonly in your heart — and is swept through your bloodstream to lodge in narrower brain arteries. This type of blood clot is called an embolus.” (Mayo Clinic)

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Stroke

- Hemorrhagic
 - “When a blood vessel in your brain leaks or ruptures”
 - Usually caused by blood thinners, hypertension, or aneurysm
 - Arteriovenous malformation (less common)
 - Intracerebral
 - A blood vessel in the brain ruptures and leaks into the surrounding tissue causing cellular damage
 - Brain cells beyond the leak do not receive blood flow so are deprived of oxygen
 - Often due to trauma, blood thinners, hypertension

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Stroke

- Hemorrhagic
 - “Subarachnoid”
 - “An artery on or near the surface of your brain bursts and spills into the space between the surface of your brain and your skull”
 - Often signaled by a sudden, severe headache
 - Often due to aneurysm



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Symptoms

- Face
 - Look for a droop
- Arms
 - Look for drift
- Speech
 - Slurred or disordered speech/language
- Time
 - React immediately! Call 9-1-1

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Additional Symptoms

- Sudden numbness (arms, legs, face, etc.)
- Confusion
- Visual trouble (e.g., double, can't focus, etc.)
- Trouble walking or with balance
- Severe headache with no known cause (National Stroke Association)

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Risk Factors



- Lifestyle
 - Being overweight or obese
 - Substance use disorder
 - Physical inactivity
- Medical
 - Hypertension
 - Diabetes
 - High cholesterol
 - Family history of stroke
 - Sleep apnea (Mayo Clinic)

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Risk Factors

- Other
 - Age
 - Race
 - Sex
 - Birth control pills

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Impairments

- Attention
- Memory
- Executive Functioning
- Problem Solving
- Language
- Pragmatics
- Swallowing
- Physical Symptoms



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Impairments- Language

- Aphasia
 - “An acquired language impairment resulting from a focal brain lesion in the absence of any other cognitive, motor, or sensory impairments.” (Coppens, 2016)
 - “Breakdown in specific language domains resulting from a focal lesion.” (Lesser, 1987)
 - “Selective breakdown of language processing itself, of underlying cognitive skills, or of the necessary cognitive resources resulting from a focal lesion.” (Ellis & Young, 1988; McNeil, 1982)
 - Includes expressive and receptive components

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Impairments- Language

- Aphasia
 - Global
 - Broca's
 - Wernicke's
 - Primary Progressive
 - Anomic
 - Mixed Non-Fluent

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Impairments- Language

- Global
 - Most severe type, impaired comprehension and expression
- Broca's
 - Non-fluent, agrammatic, speech output severely impaired, may understand speech and reading; limited writing and verbal expression
- Wernicke's
 - Fluent, jargon, neologisms, comprehension is impaired, reading/writing impaired (National Aphasia Association)

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Impairments- Language

- Anomic
 - Non-fluent, inability to find words, particularly nouns and verbs
- Mixed Non-Fluent
 - Similar to Broca's in expression, but also with impaired reading, writing, and comprehension (National Aphasia Association)



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Impairments- Speech

- Dysarthria
 - “disturbance in the sensorimotor processes of speech production associated with damage to the central and/or peripheral nervous system” (Lowit & Kent, 2016)
 - “A speech disorder resulting from a weakness, paralysis, or incoordination of the speech musculature that is of neurological etiology” (Darley, Aronson, & Brown, 1975)
 - “A group of neurologic speech disorders resulting from abnormalities in the strength, speed, range, steadiness, tone, or accuracy of movements, required for control of the respiratory, phonatory, resonatory, articulatory, and prosodic aspects of speech production” (Duffy, 2013)

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Impairments- Speech (ASHA)

- Dysarthria Types
 - Flaccid
 - continuous breathiness
 - diplophonia
 - audible inspiration or stridor
 - nasal emission
 - short phrases
 - hypernasality
 - rapid deterioration and recovery with rest
 - imprecise alternating motion rates (AMRs)

<https://www.asha.org/Practice-Portal/Clinical-Topics/Dysarthria-in-Adults/Distinguishing-Perceptual-Characteristics/>

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Impairments- Speech (ASHA)

- Dysarthria Types
 - Spastic
 - slow rate
 - strained or harsh voice quality
 - pitch breaks
 - slow and regular AMRs
 - Ataxic
 - irregular articulatory breakdowns
 - excess and equal stress
 - distorted vowels
 - excessive loudness variation
 - irregular AMRs

<https://www.asha.org/Practice-Portal/Clinical-Topics/Dysarthria-in-Adults/Distinguishing-Perceptual-Characteristics/>

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Impairments- Speech (ASHA)

- Dysarthria Types
 - Hypokinetic
 - monopitch
 - monoloudness
 - reduced loudness and stress
 - tendency for rapid or accelerated rate
 - inappropriate silences
 - rapidly repeated phonemes
 - palilalia
 - rapid, "blurred" AMRs

<https://www.asha.org/Practice-Portal/Clinical-Topics/Dysarthria-in-Adults/Distinguishing-Perceptual-Characteristics/>

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Impairments- Speech (ASHA)

- Dysarthria Types
 - Hyperkinetic
 - prolonged intervals
 - sudden forced inspiration/expiration
 - transient breathiness
 - transient vocal strain or harshness
 - voice stoppages/arrests
 - voice tremor
 - myoclonic vowel prolongation
 - intermittent hypernasality
 - marked deterioration with increased rate
 - inappropriate vocal noises
 - intermittent breathy/aphonic segments
 - distorted vowels
 - excessive loudness variation
 - slow and irregular AMRs

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Impairments- Speech (ASHA)

- Dysarthria Types
 - Unilateral Motor Neuron
 - slow rate
 - imprecise articulation
 - irregular articulatory breakdowns
 - strained voice quality
 - reduced loudness

<https://www.asha.org/Practice-Portal/Clinical-Topics/Dysarthria-in-Adults/Distinguishing-Perceptual-Characteristics/>

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Impairments- Cognition

- Attention (Sohlberg & Turkstra, 2011)
 - Focused
 - Most basic form of attention, responding to pain, cold, etc.
 - Sustained
 - Vigilance, paying attention for a longer period of time to one thing
 - Selective
 - Paying attention to a single thing amidst other distractions (e.g., staying focused on reading while the tv is on)
 - Alternating
 - turning attention to various tasks, e.g., secretary writing an email, answering the phone, and then having the ability to return to the email
 - Divided
 - the ability to attend to multiple things at the same time

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Impairments- Cognition

- Memory
 - Prospective
 - Short term
 - Working memory
 - Long term (implicit, explicit, etc.)
- Problem Solving

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Impairments- Cognition

- Executive Functioning
 - Patients present with difficulty planning and organizing tasks, initiating tasks, completing tasks
 - Patient may have difficulty inhibiting responses (less filter!) and decreased insight
 - Involves ability to sustain attention to a single task, working memory, and pragmatic skills

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Impairments- Dysphagia

- Problems involving the oral cavity, pharynx, esophagus, or gastroesophageal junction (ASHA Dysphagia Practice Portal)
- Can result in dehydration, malnutrition, aspiration pneumonia, other lung disease processes, and possibly death
- Variety of dysphagia challenges associated with stroke

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Assessment

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continued

Assessment

- Medication
- Level of consciousness
- Physical symptoms
- Communication
- Family dynamics



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Assessment

- Screener
- Informal observation of functional tasks
- Interdisciplinary group intake
 - All components of core therapy team go into patient's room on day of admission. What should the focus of the evaluation be?
- Formal evaluation
 - Dependent on patient's language skills and ability to participate
 - Western Aphasia Battery
 - Boston Diagnostic Aphasia Evaluation
 - Mini-mental Status Examination

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Assessment of Dysphagia

- All assessment should begin with:
 - Patient history
 - Oral motor examination
 - Cranial nerve involvement (e.g., CN VII- facial nerve)
 - Dentition
 - Cognitive-communication screen
 - Observation of function

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Non-Instrumental Assessment

- Bedside Swallow Assessment
 - Many different protocols, some more standardized than others
 - Virvidaki et al. (2018) note “no present screening protocol provides high specificity and sensitivity for predicting the risk of aspiration. It appears that a cluster of swallowing and non-swallowing features may achieve both high sensitivity and specificity at the bedside.”

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Instrumental Assessment

- Videofluoroscopic Swallow Study (VFSS) or Modified Barium Swallow Study (MBSS)
- Fiberoptic Endoscopic Evaluation of Swallow (FEES)
- (Modified Evans) Blue Dye Test
- Not always appropriate
 - Level of arousal
 - Cognitive- communication deficit
 - Behavior

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Functional Treatment

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Speech & Language

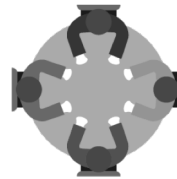
- Structured conversation with fellow patients, staff, and family members
- Requests from staff for various items
- Use of compensatory strategy for nonverbal patients who can attend and are aware enough (e.g., communication board, text on phone, writing, etc.)
- Increase intelligibility in structured and non-structured environments
- *Be sure to observe the patient's speech and language not only in the therapy environment but also in more complex environments to determine functional communication*

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Speech & Language

- Speech and language is a perfect area of focus for a co-treatment. Any therapy session involving communication can serve as a speech and language treatment task.
- Walking with PT, work on patient's intelligibility strategies throughout session
- OT and SLP bathing co-treat, ask patient to name items in shower



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Speech & Language

- Community outing with recreational therapy, ask patient to order food items for self and other patients with focus on pragmatics
- Most functional treatment for dysarthria? Speaking and swallowing!!

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Memory

- SLP
 - Patient will recall names of primary therapists with moderate visual and verbal cues
 - Patient will route to room using environmental cues with maximum verbal cues
- Co-treatment PT and SLP: Memory
 - Patient will recall steps to safely transfer from bed to walker with minimal verbal cues
 - SLP review photos of transfer steps with patient at beginning of session. Patient sequences these. Then SLP and PT assist patient with physical transfer

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Memory

- Patient will write down his/her schedule every morning
- Patient will identify medication and purpose of medication at each administration
- Patient will recall compensatory strategies for dressing the lower extremity



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Attention

- Patient will attend to 15-minute treatment session with moderate verbal cues
- Patient will attend to safety signs on unit while routing to room with minimal verbal cues
- Co-treatment OT and SLP: Attention
 - Patient will prepare a hot meal for three fellow patients with moderate verbal cues for attending to tasks and sequencing
 - Can build on discipline specific and interdisciplinary goals

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Executive Functioning

- Goal setting and planning (patient-centered goals!)
- Scavenger hunt around unit
- Meal plan and grocery store outing (co-treat with TR, PT, or OT)
 - Choose meal for xx number of people
 - Sequence steps to meal
 - Write out and organize grocery list
 - Plan route to grocery store
 - Estimate cost of grocery items



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Treatment of Dysphagia

- Clinical (non-instrumental) and/or instrumental assessment should *always* occur prior to initiating treatment
- Rehabilitative/Restorative
 - Restoration of function
- Compensatory
 - Strategies, diet modification, etc.
 - Goal is not to restore function, but prevent aspiration or signs/symptoms of dysphagia (Vose, Nonnenmacher, Singer, & González-Fernández, 2014)
- Both

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Case Study

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Case Study

55-year-old man, status post left-sided intracranial hemorrhage presents to your inpatient rehabilitation unit. His stroke was 2 weeks ago. Patient has a history of hypertension, diabetes, and chronic pain. He is right-handed and has a college education. He works as a government contractor as a project manager.

- What symptoms can you expect?
- How do you evaluate this patient?
- Where do you start treatment?

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