**Cerebrovascular Accident: Chapter 24**

Cerebrovascular accident (CVA, Stroke) is the leading cause of serious long-term adult disability more than 4 million stroke survivors live in the US alone

- Stroke is sudden loss of blood supply to brain that damages & kills brain cells, resulting in neurological deficits related to involved areas of the brain. Symptoms include:

* Hemiplegia: one sided paralysis
* Hemiparesis: partial motor loss on one side of the body
* Stroke effects are experienced on one side of the body opposite to the hemisphere of the brain that suffered the lack of blood supply (right hemisphere Affects left side and left hemisphere affects right side) Affect trunk, face, and oral muscles
* TIA (transient ischemic attacks) are incomplete strokes with symptoms that usually go away between a few minutes to 24 hours

**Etiology**: stroke occurs in either of two ways

* Ischemic: sudden blockage of a blood vessel in the neck or brain, causing brain tissue to be deprived of oxygen (87% of total strokes are caused by thrombus)
* Hemorrhagic: blood vessel bursts in brain (10% of stroke but higher death rate)

Risk factors: stroke risk factors are classified as modifiable (controllable) and Nonmodifiable (non-controllable)

* Modifiable (controllable) include: hypertension, cardiac disease, diet, obesity, alcohol abuse, high cholesterol, diabetes mellitus, and more
* Nonmodifiable (non-controllable) include: age, gender, race, genetic disposition
  + Men have slightly higher risk of stroke then women

**Effects**: can cause severe loss of function of many body systems and mental functions, sensory, neuromuscular, movement, and voce/speech functions.

- Warning signs include: All sudden symptoms. Numbness of face, arm or leg on one side of the body, confusion, difficulty speaking or understanding, blurred vision or loss of vision, difficulty walking, dizziness, loss of balance or coordination, & severe headache

- Dysfunction and severity depend on the type, size, location, and density of brain damage and the timing and success of medical care

* After stroke flaccid paralysis (absence of muscle tone) and Hypotonicity (low muscle tone) are present along with reduced or absent reflexes
  + Other losses include impaired postural control, sensory deficits, visual, and more
  + Spontaneous recovery of motor function occurs mostly in first 3 months after injury but can continue up to 1 year

- Medical management: Emergency treatment of CVA maintain open airway, establish fluid balance, and treat all medical problems. Surgery is an option to repair damaged blood vessels in the brain

- Medical Complications: most common is deep venous thrombosis (DVT) which usually develop in the veins of the legs (usually affected paralytic leg)

* Blood clots released from deep veins can get lodged in lungs and cause death within the first month after CVA
* Medical imaging is done to determine DVT then after diagnosis the affected limb must be elevated and non-weight bearing until clot is resolved
  + - Prevention includes early exercise, medication, and use of elastic stockings
* Subluxation: occurs in the glenohumeral joint of UE and is a separation of the joint as a result of paralysis or weakness of rotator cuff muscles and spasticity of scapular muscles
  + Can cause pain and deformity. OT can palpate shoulder & confirm w/xray
* Seizures are common to 10% to 18% of patients after damage to brain tissue
* Skin breakdown, aspiration, bowel and bladder incontinence are common risks

**Occupational Therapy Intervention:** The role of occupational therapy in treatment of CVA:

* Improve motor function, integrate sensory-perceptual and cognitive functions, facilitate max level of function in independence, encourage resumption of life roles, promote health management and maintenance behaviors to prevent recurrent stroke
* At early stage, OT stresses mobility, graded exercise to activity tolerance, prevention of complications, basic self-care training, and gather info for next level of rehab care

- Occupational Therapy Programming considerations: based on client centered approach with evaluation of performance skills and areas of occupation, as well as, values and beliefs.

* OT assessment of contextual factors like environmental, social, & cultural considerations

- Confounding Factors: OTA’s should monitory all factors of CVA patient

* Review chart and consult with OT about medical changes, be aware of presence of feeding tubes, catheters, and IV lines, check and adhere to all precautions with vital signs, begin each session with assessment of vital signs, mental status, and activity tolerance, and continue to monitor vital signs

- Gradation of Treatment: treatment is graded by increasing length and complexity of activity

**Occupational Performance Domain of Concern for Treatment:** treatment begins with tasks to prepare client for occupation and activities and leads to practicing roles and reintegration

**Dysfunction Characteristics and Occupational Therapy Interventions:** Abnormal reflexes and postural mechanisms affect CVA patient. Must have ability to maintain and recover balance, stability, body alignment, and mobility skills.

- Positioning Techniques: is important to maximize effects of abnormal muscle tone

* Positioning of spastic extremities can reduce risk of contractures or skin ulcers
* Positioning of hypotonic (low muscle tone) can reduce risk of overstretching muscles
* In bed, alternated between supine, laying on affected side and on unaffected side
* Symmetry of trunk alignment is vital & position changes should prevent additional harm
* In upright sitting, trunk should be symmetrical and affected arm should be supported with pillows. Lumbar and feet should always be supported
* Resting hand splints helps protect arm from contractures and deformities and they are commonly employed to maintain and support hand in clients with hypotonia.

- Abnormal Muscle tone: after CVA, flaccid paralysis is often replaced by spastic paralysis

* Patients move affected extremity in flexion or extension patterns called synergies
  + Extension synergy is more dominant in LE
* Hypertonicity (high muscle tone) tends to increase with stressful bodily changes like pain, fatigue, muscle weakness, infections, injury, ulcers, and more

- Motor Skills Deficits: voluntary control of affected UE is usually absent and as it returns it usually develops from trunk, into shoulder and hip, and down to extremities (proximal to distal)

- Balance Impairment: may have troubles sitting or standing erect. Poor automatic and postural adjustments against gravity and client compensates with decreased ability to bear weight on hemiplegic side and then they are leaning to one side (poor sensation affects balance)

* Balance training in UE and balance supports while seating can help balance impairment

- Occupational Therapy Treatment Technique: to support task performance & max functioning

Passive and Active ROM: PROM should be performed at least 2 times day

* ROM can be limited by pain, edema, fractures, joint diseases, and more
* PROM exercises of affected UE are performed by client with unaffected side
* Self-ROM (SROM) are required when mvmt is weak, and the unaffected UE fully supports the affected UE through all exercises
* Active ROM is performed only by patient and requires voluntary mvmt of affected UE

Treatment of shoulder subluxation and pain: pain can be prevented by proper positioning, PROM exercises, education to patient, staff, and family on proper handling techniques

* The use of arm slings must come with proper education to prevent extra harm
  + Proper purpose of sling and proper technique for sling application

- Motor Retraining: encourage normal postural mechanisms, movement, and use of affected side

* Constraint-induced movement therapy: combines forced use of affected arm via intensive training through active participation in functional activities
* Robotic Assisted therapy provides opportunity for high intensity, repetitive, task-specific, and interactive treatment of affected UE
  + The Wii or Kinect provide opportunity for motor retraining

- Influence muscle tone through the use of active movement of hypotonic muscles, positioning and handling, proprioceptive input, and more

- Bilateral Integration: increased tactile and visual input and using both hands to perform a task

- Evaluation and retrograde message: edema can be caused by many factors including immobility, poor circulation, dependent positioning, sensory loss, and over exercise.

* Edema can be prevented by elevating extremities, massage distal to proximal, AROM

**Sensory System Dysfunction:** if sensation returns it usually comes back proximal to distal

- Visual deficits: strokes usually reduce visual functions like distance vision, peripheral vision, ability to use eye together to focus. Diplopia (double vision) may also occur

* Hemianopsia: is a permanent visual defect after stroke that results in loss of vision on the contralateral half of visual field

- Auditory, tactile, olfactory, and gustatory deficits are common symptoms after a stroke affecting functional abilities

**Perceptual Dysfunction:** involves interpreting sensory info from environment

- Visual perceptual impairments include visual attention and search

* Visual attention is a purposeful visual response to environment and can be sustained
* Visual search is the proves of selecting objects on which to focus attention by scanning

- Spatial relations deficits: ability to recognize shapes and recognize relationship between objects and between object and self

* Visual figure-ground perception is the ability to distinguish forms hidden within a complicated background
* Difficulty with vertical or horizontal orientation may be present. OT’s use verbal cueing

**Perceptual Motor Impairments:** rely on processing of sensation to dev. adapt. motor responses

- Unilateral neglect: the inability to interpret perceptual messages from hemiplegic side or space

- Apraxia: an impaired ability to plan motor acts

- Agnosia: refers to the inability to recognize objects by vision, hearing, touch, or proprioception despite intact symptoms

Occupational Therapy Treatment Considerations: Compensatory Strategies use intact skills to substitute deficits

* OT’s can use mirrors, clothing labels, different signs, environmental cues, tactile cues, and more

**Cognitive Dysfunction:** Initiation and motivation deficits- difficulty starting and finishing tasks

* OT can help with step by step assistance to complete task

- Attention and concentration deficits: inabilities to attend to info and maintain focus

- Disorientation and confusion: difficulty with awareness of person, place, time, and situation

- Memory Deficits: affects both short and long-term memory

- Sequencing & organization deficits: difficulty planning, organizing, & completing steps of task

- Abstract reasoning and problem-solving: difficulty planning ahead, recognizing problems, or generating solutions for situations

- Thought inflexibility involves the flow of thoughts or ideas and may be affected by stroke

- Cognitive fatigue: decreased attention and concentration, increased lethargy, increased distractibility, increased performance errors, decreased quality control, and more fatigue

Occupational Therapy Treatment Considerations compensatory strategies include…

* Verbal and tactile cues to stimulate initiation and establishing meaningful and achievable treatment goals with improve motivation (frequent positive feedback)
* Memory usually include devices: notebooks, daily calendars, watches, labels, phones, etc.
* OT intervention for organization focus on gradual increase of task complexity
* Easing transitions from one activity to another reduces stress for rigid thinking patients
* Increasing instruction time, repeating details, & using written instruction can help with learning deficits

**Behavioral Manifestations:** Impulsivity and perseveration which decreased insight and the meaningless, non-purposeful repetition of an action.

- Mood/emotional impairments include depression, lability, anxiety, & overall inappropriateness

* Emotional lability: which is the inability to control the expression of emotions

- Psychosocial adjustment and adaptation: important for the OT practitioner to aid in the clients and family’s adaptation to disability

* Client-centered approach are crucial to this proves of understanding how each client’s participation and satisfaction with activities and occupations were affected by stroke
* OT practitioner can provide coping mechanisms for patient and family involved

- Occupational Therapy Treatment Considerations: focus on development of appropriate behaviors and generalization to daily life and certain skills

- Behavioral Intervention Strategies: for impulsivity the OT should give directions slowly, verbally, or in written form one step at a time and using calm approach in nondistracting setting

* OT should include interventions with choice & that use immediate positive reinforcement
* OT should address social skills and work on appropriate social interactions

**Oral-Motor Dysfunction**: coordination of movement for speech, facial expression, sucking, chewing, and swallowing involving all muscles of face, throat, and tongue.

- Dysarthria: facial palsy causing difficulties pronouncing words and sounds with slurred speech

- Dysphagia: difficulty in swallowing or the inability to swallow because of sensory loss

**Speech and Language Dysfunction:** OT’s role is to promote communication by reinforcing techniques and adapting augmentative communication devices

- Aphasia is an acquired language disorder that may result in wide variety of deficits like verbal comprehension, reading comprehension, oral expression, written expression, math skills, & more

Occupational Therapy Treatment Considerations for OT with clients who have aphasia

* Be patient, reduce environmental distractions, speak clearly, ask yes or no questions, stress the important words in sentences, use face to face communication and more

**Hemispheric Lateralization**

- Left-sided CVA: most right-handed person, responsible for language, time, & analytical thinking. Clients with right-sided hemiplegia often demonstrate aphasia and apraxia

- Right-sided CVA: right side control visual perceptual skills and perception as a whole

* Difficulties in tasks that require spatial analysis and orientation and dressing praxis

- Bilateral CVA: overall motor loss from both sides (look more like TBI patients)

**Cerebellum and Brainstem Stroke:** can cause abnormal reflexes of head and torso, coordination and balance problems, dizziness, problems with swallowing and articulating, and cranial nerve defects

All areas of occupation are affected from a stroke; ADL, IADL, work, education, social, etc.