Lesson 6.1 Objective

- Discuss anatomic structures and physiologic processes related to the nervous system.

Overview of Nervous System

- Functions
  - Helps maintain homeostasis
  - Responsible for:
    - Mental processes
    - Behaviors
    - Emotional responses

Neuron Structure

- Dendrites
- Cell body
  - Nucleus
- Axon

Synapse

Functions of Nervous System

- Sensory function: receptors detect stimuli and respond by sending information to the CNS
- Integration function: CNS integrates this information and decides on a response
- Motor function: motor neurons carry impulses from the CNS to the muscles and glands
Central Nervous System

- Brain
  - Housed in skull
- Spinal cord
  - Housed in vertebral column
- Both brain and spinal cord protected by meninges and cerebrospinal fluid

Brain Structure

- Brainstem
- Cerebellum
- Diencephalon
- Cerebrum

Peripheral Nervous System

- Somatic nervous system
  - Consciously controlled (voluntary)
- Autonomic nervous system
  - Not consciously controlled (involuntary)
  - Divided into parasympathetic and sympathetic nervous systems

Autonomic Nervous System

- Parasympathetic
  - Rest-and-digest
- Sympathetic
  - Fight-or-flight

Lesson 6.2 Objectives

- Identify central nervous system disorders and list appropriate massage considerations.
- List first aid measures to be implemented when a person is experiencing a seizure.
- Describe appropriate measures used when working with wheelchair-bound clients.
**Lesson 6.2 Objectives (cont’d.)**

- Define infectious diseases of the nervous system and list appropriate massage considerations.

**CNS Disorders**

- Cerebral palsy
- Spina bifida
- Seizure disorders
- Spinal cord injury
- Attention deficit-hyperactivity disorder
- Autism

**Cerebral Palsy**

- Group of motor disorders; damage to cerebrum from inadequate or reduced blood flow
- Lighter pressure; avoid joint mobilizations or administer carefully; instruct parents to massage if affected person is a child

**Spina Bifida**

- Group of neural tube defects; failure of posterior spinous processes to close (usually lumbar spine)
- Local contraindication; avoid joint mobilizations and compressions or administer carefully; instruct parents to massage if affected person is a child

**Seizure Disorders**

- Explosive episodes of uncontrolled and excessive electrical activity in the brain; two types
  - Partial: limited to single area of brain
  - Generalized: more diffuse involvement
- Postpone massage if condition is untreated; avoid known triggers; use first aid measures if client experience tonic-clonic seizure

**Seizure Disorders (cont’d.)**

- Tonic phase (about 5 seconds)
- Clonus phase (about 15 seconds)
- Clonic phase
- Status epilepticus
- Drowsy phase
First-Aid for Seizures

- Remain calm and begin to time seizure
- Clear area of objects
- Gently place person on floor (if possible)
- Place soft material or cushion under head; lift chin slightly to open airway
- Roll on side if choking or vomiting
- Remain with person until seizure has ended

First-Aid for Seizures (cont’d.)

- If seizure lasts more than 5 minutes or immediately repeats, call 911, then:
  - Talk calmly to person until help arrives
  - Inform medical personnel how long seizure occurred and symptoms exhibited
  - Write incident report

Spinal Cord Injury

- Damage to the vertebrae and neural tissues causing loss of movement (paralysis) and loss of sensation distal to area of insult
  - Paraplegia: paralysis of the lower extremities and trunk
  - Quadriplegia: paralysis of the trunk and all extremities
- Medical clearance is needed

Spinal Cord Injury (cont’d.)


Attention Deficit-Hyperactivity Disorder (ADHD)

- Array of behaviors associated with inattentiveness, hyperactivity, impulsivity, or combination of these
- Reduce treatment time; instruct parents to massage if affected person is a child

Autism

- Syndrome of social withdrawal and obsessive behavior; five types ranging from mild and highly functional to severe
- Reduce treatment time; use firm gliding and compressive strokes with full hand contact; instruct parents to massage if affected person is a child

Wheelchair-Bound Clients

- Maintain eye level during intake interview
- Inquire about any medications and their side effects such as drowsiness
  - If indicated, use stimulating strokes at the end of session and ask client to move slowly and carefully
- Observe wheelchair etiquette

Wheelchair-Bound Clients (cont’d.)

- Avoid skin lesions such as bedsores
- Use light to moderate pressure depending on sensation level
- Trigger points are often located in shoulders and chest area
- Limit ROM exercises, especially on neck, spinal column, and hip joints

Infectious Diseases

- Meningitis
- Encephalitis
- Poliomyelitis and Postpolio syndrome

Meningitis

- Inflammation of the meninges most often the result of a viral or bacterial infection
- Massage is contraindicated until client completely recovers

Encephalitis

- Inflammation of the brain usually the result of a viral infection
- Massage is contraindicated until client completely recovers

Poliomyelitis
- Highly contagious viral infection that is now rare
- Massage contraindicated until client completely recovers

Postpolio Syndrome
- Collection of symptoms seen in individuals who have previously recovered from polio or who were misdiagnosed, but now considered to have been infected
- Light massage of shorter duration; omit or only cautiously apply passive stretches and jt. mobs

Lesson 6.3 Objectives
- Name neurodegenerative diseases and state appropriate massage considerations.
- List warning signs of Alzheimer disease.
- Define vascular disorders and list appropriate massage considerations.
- List warning signs of stroke.
- Name conditions of the peripheral nervous system and list appropriate massage considerations.

Neurodegenerative Diseases
- Dementia
- Alzheimer disease
- Huntington disease
- Parkinson disease
- Multiple sclerosis
- Amyotrophic lateral sclerosis

Dementia
- Group of disorders characterized by a decline of mental facilities and personality changes that interfere with work, social activities; two most common types are Alzheimer and vascular
- Gentle massage of shorter duration during later stages; behavior tolerance is needed

Alzheimer Disease
- Progressive degenerative disease of the brain
- Gentle massage of shorter duration during later stages; behavior tolerance is needed
**Warning Signs of Alzheimer Disease**

- Recent memory loss that impairs functioning at work or home
- Problems with language
- Disorientation in time and space; getting confused or lost in familiar places
- Difficulty completing familiar tasks
- Distorted judgment
- Problems with abstract thinking

**Huntington Disease**

- Inherited disorder characterized by motor disturbances, mental deterioration, and abnormal behavior
- Light massage of shorter duration; omit or only cautiously apply passive stretches and jt. mobs

**Parkinson Disease**

- Disorder producing abnormal movements marked by destruction of dopamine-producing neurons in the brain
- Gentle massage of shorter duration

**Multiple Sclerosis**

- Progressive neural demyelination
- Massage contraindicated during flare-ups; otherwise gentle massage of shorter duration; evaluate client at each visit as symptoms change

**Amyotrophic Lateral Sclerosis (Lou Gehrig’s Disease)**

- Degeneration of motor neurons leading to secondary demyelination; this causes generalized paralysis leaving the affected person immobile
- Gentle massage of shorter duration
Vascular Disorders
- Cerebrovascular accident (stroke)
- Transient ischemic attack
- Migraine headache

Transient Ischemic Attack
- Brief episode of impaired brain functioning caused by temporary reduction of blood flow; lasts a few seconds to possibly hours and is characterized by visual disturbances, speech difficulties, and difficulty understanding others
- No modifications needed

Cerebrovascular Accident (Stroke)
- Sudden disruption in cerebral blood flow by occluded or ruptured blood vessel
- Obtain medical clearance during rehab stage; initial sessions should be brief (up to 30 min), gradually increasing to 1 hr

Cerebrovascular Accident (cont’d.)

Stroke Warning Signs
- Sudden or transient weakness, numbness, or tingling in face, arm or leg, or on one side of the body
- Temporary loss of speech, failure to comprehend, or confusion
- Sudden loss of vision
- Sudden severe headache
- Unusual dizziness or loss of balance

Migraine Headache (Vascular Headache)
- Severe, recurrent headaches accompanied by symptoms such as visual disturbances and nausea; often provoked by a trigger factor
- Massage is contraindicated during attack
Peripheral Nerve Disorders

- Trigeminal neuralgia
- Bell palsy
- Myasthenia gravis
- Guillain-Barré syndrome
- Peripheral neuropathy
- Degenerative disc disease
- Herniated and bulging discs, and radiculopathies
- Sciatica
- Carpal tunnel and thoracic outlet syndromes

Bell's Palsy

- Condition of facial nerve (cranial nerve VII) causing muscle weakness or paralysis on one side of face
- Use light gliding strokes directed upward, and kneading, percussion, and vibration on facial muscles

Myasthenia Gravis

- Disorder caused by loss of acetylcholine receptors within the neuromuscular junction resulting in progressive weakness and paralysis
- Gentle massage of shorter duration

Guillain-Barré Syndrome

- Neurologic inflammatory disease of the peripheral nerves; typically begins as leg weakness and ascends to trunk and arms
- Massage is contraindicated until the client has fully recovered

Peripheral Neuropathy

- Inflammation or degeneration of PNS causing symptoms of impaired sensations and movement difficulties
- Reduced pressure while avoiding hypersensitive areas; if neuropathy in in lower extremities, avoid bolster use

Trigeminal Neuralgia (Tic douloureux)

- Condition characterized by excruciating episodic pain in areas supplied by the trigeminal nerve (cranial nerve V)
- Avoid prone position and avoid massage to the face and scalp

Peripheral Neuropathy

- Inflammation or degeneration of PNS causing symptoms of impaired sensations and movement difficulties
- Reduced pressure while avoiding hypersensitive areas; if neuropathy in in lower extremities, avoid bolster use
Degenerative Disc Disease

- Deterioration of the intervertebral discs resulting from the aging process
- Medical clearance required; once obtained, reduce pressure over affected areas and avoid spinal mobilizations

Herniated Disc, Bulging Disc, and Radiculopathies

- Herniated disc – protrusion of nucleus pulposus through tear in annulus fibrosus
- Bulging disc – similar to herniated disc but nucleus pulposus contained within annular wall
- Radiculopathy – pain radiating along the path of a compressed nerve

Herniated Disc, Bulging Disc, and Radiculopathies (cont’d.)

- Symptoms include severe, sharp pain that may worsen with movement; limited ROM; tenderness; paresthesias
- Postpone massage if pain is severe; otherwise, reduce pressure over affected areas and in areas of paresthesias; avoid spinal mobilizations

Sciatica

- Inflammation of the sciatic nerve
- Reduce pressure in areas of paresthesias; avoid use of bolsters on lower extremities

Carpal Tunnel Syndrome

- Compression of the median nerve within the carpal tunnel
- Local contraindication if area is inflamed

Avoiding Carpal Tunnel Syndrome

- Strengthen forearm and hand muscles
- Keep wrists neutral while working
- Perform regular self-massage of forearms and hands
- Use variety of strokes during the massage
- Rest hands by spacing clients
- Stretch between sessions
- Lower table height
Thoracic Outlet Syndrome

- Compression or entrapment of neurovascular bundle
- Avoid vigorous massage if swollen or inflamed; otherwise, massage is helpful