



**AMREF INTERNATIONAL UNIVERSITY**  
**SCHOOL OF MEDICAL SCIENCES**  
**DEPARTMENT OF REHABILITATION MEDICINE**  
**BACHELOR OF SCIENCE IN PHYSIOTHERAPY**

**END OF TRIMESTER EXAMINATIONS JANUARY TO APRIL 2024**

**UNIT CODE: PHT 313**

**UNIT NAME: NEUROREHABILITATION 1**

**DATE: 8<sup>TH</sup> APRIL 2024**

**TIME: 6PM-8PM**

**INSTRUCTIONS**

1. All students will have two (2) hours to complete the examination
2. This is an **online exam**. Attempt all questions as per the instruction
3. It is the student's responsibility to report any page and number missing in this paper.
4. Check that the paper is complete
5. Total number of pages is 11 including the cover.
6. Read through the paper quickly before you start.
7. Upon finishing the exam paper, on submission, the message 'Your examination has been submitted' will appear.

**TOTAL: \_\_\_\_\_/50**

**PERCENT: \_\_\_\_\_/100%**

**POINTS EARNED TOWARDS FINAL GRADE \_\_\_\_\_/70**

1. What is the best sequence for making clinical decisions for movement-related diagnoses?
  - A. Create a hypothesis, perform an intervention based on the hypothesis, then evaluate the movement pattern.
  - B. Determine the patient-identified problem, perform body structure/function tests and measures, confirm the medical diagnosis, and perform an intervention.
  - C. Gather relevant intake and history, perform a movement analysis, create a hypothesis, test and evaluate the hypothesis, form a movement diagnosis, generate a prognosis, develop and implement a plan of care, then determine outcomes.
  - D. Perform a movement analysis, compare the movement with the medical diagnosis, then perform an intervention.
  
2. A person presents with rapid onset of right facial paralysis with bilateral weakness of the frontalis muscle in the forehead. Based on this information, what is the most likely diagnosis for this person?
  - A. Bell's Palsy (Facial Nerve Palsy)
  - B. Parotid Gland Tumor
  - C. Stroke
  - D. Traumatic Brain Injury
  
3. What type of perceptual disorder is represented by the inability to correctly carry out multi-step verbal commands to perform an activity of daily living?
  - A. Agnosia
  - B. Apraxia
  - C. Figure-ground
  - D. Neglect
  
4. Which of the following neuroplasticity principles suggests that the nature of the training experience dictates the nature of plasticity?
  - A. Intensity
  - B. Repetition
  - C. Salience
  - D. Specificity
  
5. Which of the following tests could be used to determine if a person has neglect post-stroke?
  - A. Extinction test
  - B. Figure-ground test
  - C. Proprioception test
  - D. Stereognosis test

6. A person with hemiplegia is unable to initiate pelvic movement when attempting to roll from supine to sidelying. Which of the following muscles should be targeted to directly influence pelvic movement?
- A. External abdominal oblique
  - B. Pectoralis major
  - C. Rectus femoris
  - D. Sternocleidomastoid
7. A patient with hemiplegia presents with inconsistent step length while walking, balance deficits with feet shoulder width apart when standing on firm surfaces with eyes closed, and instability during the stabilization phase of sit-to-stand. Given this information, what would be the MOST LIKELY hypothesis to account for the movement observations?
- A. Impaired ankle proprioception
  - B. Vestibular system deficit
  - C. Weak tibialis anterior
  - D. Weak quadriceps
8. What strategy would facilitate communication with a person post-stroke with Wernicke's aphasia?
- A. Encourage automatic speech
  - B. Offer word choices
  - C. Provide visual demonstration
  - D. Use sound cues
9. A person with a posterior lateral thalamus stroke has a movement system diagnosis of "Pusher Syndrome". Of the choices provided, which intervention should be prioritized to address this diagnosis?
- A. Align the person's forearm to vertical and then align the body to his forearm.
  - B. Identify a vertical line on the wall or mirror and align the whole body to the vertical line.
  - C. Push the person toward the right side to realign them to a vertical upright posture.
  - D. Request the patient push toward the right against manual resistance at the shoulder.
10. A person post-stroke draws a picture of himself and the left side is missing many parts. Based on this information, what is the most likely diagnosis?
- A. Astereognosis
  - B. Constructional apraxia
  - C. Ideational apraxia
  - D. Neglect syndrome
11. Which of the following problems best characterizes a lesion to Wernicke's area?
- A. Halting, non-fluent speech
  - B. High self-awareness of language deficits

- C. Impaired auditory comprehension of words
  - D. Specific deficits of word articulation
12. What type of perceptual disorder is represented by the inability to identify objects when placed in the hand?
- A. Agnosia
  - B. Apraxia
  - C. Figure-ground
  - D. Neglect
13. A person with left hemiplegia has a movement system diagnosis of “Difficulty reaching with the left upper limb due to left neglect.” Of the choices provided, which intervention should be prioritized to address this diagnosis?
- A. Align the body to a vertical line on the wall.
  - B. Apply sensory input to the left upper/lower limbs to draw attention to the left side.
  - C. Identify objects with the right hand with eyes closed.
  - D. Patch the right eye to force the left eye to locate objects in the left visual field.
14. What is a potential impairment that would impact forward propulsion for walking?
- A. Excessive activation of the fibularis longus and brevis
  - B. Poor timing of the gluteus medius
  - C. Reduced activation of the hamstrings
  - D. Reduced power of the gastric-soleus
15. A person with right hemiplegia has a movement system diagnosis of “Slow walking speed and inadequate forward propulsion due to impaired power of the right gastrocnemius.” Which of the following interventions would promote neuroplastic change for increased gait speed?
- A. Body Weight Supported Treadmill Training with emphasis on swing limb advancement.
  - B. Functional Electrical Stimulation to the left dorsiflexors during variable speed treadmill training.
  - C. Functional Electrical Stimulation to the right plantarflexors during treadmill fast walking.
  - D. Unilateral Stepping Treadmill Training with right foot stable on the side of the treadmill.
16. What structure should be targeted when using Functional Electrical Stimulation (FES) to improve the swing phase of the gait cycle?
- A. Common fibular nerve
  - B. Femoral nerve

- C. Obturator nerve
  - D. Sciatic nerve
17. Which of the following practice parameters would be most appropriate for a person 24-hours post-stroke to reduce fatigue?
- A. Constant practice
  - B. Distributed practice
  - C. Massed practice
  - D. Variable practice
18. A person with hemiplegia presents with a movement system diagnosis of “Slow walking speed and inadequate single limb support due to impaired cutaneous sensation of the foot, as evidenced by a shortened swing time and shortened step length of the unaffected leg.” Of the choices provided, which intervention should be prioritized to address this diagnosis?
- A. Functional Electrical Stimulation to the anterior tibialis muscle
  - B. Overground gait training with resistance
  - C. Sensory threshold electrical stimulation to the sole of the foot
  - D. Variable speed treadmill training
19. What is the rationale for requiring a person presenting with Bell’s palsy to have diligent eye care?
- A. The cornea can become dry and abraded leading to loss of vision.
  - B. The eyelid can droop and obstruct vision limiting ADLs.
  - C. The eye sensation can be lost and prevent detection of injury.
  - D. The person feels blinded because the eyeball rolls backwards.
20. Which of the following problems best characterizes a lesion to Broca’s area?
- A. Impaired auditory comprehension of words and sentences
  - B. Poor awareness of language deficits
  - C. Relatively effortless speech production
  - D. Restricted vocabulary
21. A person presents with a very poor trailing limb posture in pre-swing (the hip is in 5 degrees of flexion and does not get to neutral or into extension). Which of the following movement pattern requirements for gait speed will be most affected by this observation?
- A. Foot clearance
  - B. Forward propulsion
  - C. Loading Response
  - D. Shock absorption

22. What is the recovery mechanism when a person is encouraged to use a cane for balance when walking?
- A. Compensation
  - B. Penumbra salvation
  - C. Regeneration
  - D. Restitution
23. A person post-stroke walks slowly and presents with inadequate forward propulsion due to impaired power of the hip flexor muscles. Which of the following interventions would be task-oriented and drive neuroplastic change to improve gait speed?
- A. Backwards walking over ground at a self-selected speed.
  - B. Part practice standing with rapid hip and knee flexion to a target with the *uninvolved* lower limb.
  - C. Side stepping treadmill training stepping toward the involved side.
  - D. Variable speed treadmill training with emphasis on trailing limb posture and fast swing phase.
24. A person has the following compensatory gait pattern: lower limb circumduction with hip hike in swing. Based on this information alone, which of the following movement pattern categories does this most likely match?
- A. Inadequate foot clearance
  - B. Inadequate forward propulsion
  - C. Inadequate shock absorption
  - D. Inadequate single limb support
25. A patient reports poor balance when walking. Movement analysis reveals inadequate single limb support (as evidenced by a lateral trunk lean and shortened stance time). Testing confirms inadequate activation of the Anticipatory Postural Adjustment of the involved stance limb prior to step initiation of the uninvolved swing limb. Which of the following choices is the BEST intervention for this patient?
- A. Jump training in all directions (up, forward, lateral)
  - B. Part practice fast stepping to a target with the involved lower limb
  - C. Side stepping with emphasis on adductor muscles of the hip
  - D. Unilateral treadmill training with the involved lower limb stable on the side of the treadmill.
26. A person walks with a gait speed of 0.92 meters/second. At what functional level would this be best classified?
- A. Full community ambulation
  - B. Household ambulation
  - C. Limited community ambulation
  - D. Normal ambulation

27. Which of the following activities would be best for addressing inadequate gluteus medius activation during gait?
- A. Backward walking
  - B. Forward walking
  - C. Lateral walking
  - D. Unilateral stepping
28. Which of the following activities works in isolation to improve gait speed?
- A. Cardiovascular fitness training
  - B. Strength training
  - C. Treadmill training at 1.8-2.2 mph (2.9-3.5 km/h)
  - D. Walking over ground on level surfaces
29. A person post-stroke demonstrates inadequate single limb support due to impaired flexibility of the iliopsoas muscle while walking. Which of the following is the best intervention in this case?
- A. Part practice stepping with visual target to emphasize increased step length on the uninvolved side
  - B. Side stepping treadmill training stepping toward the involved side.
  - C. Unilateral treadmill stepping with the uninvolved lower limb on the stable side off of the treadmill belt.
  - D. Walking with wider steps to emphasize hip abductor activation
30. The use of jump training as an intervention is best for which of the following?
- A. Promote foot clearance that is limited due to impaired activation of iliopsoas and adductor longus muscles.
  - B. Promote forward propulsion that is limited due to excessive activation of the quadriceps.
  - C. Promote forward propulsion that is limited due to impaired power in the gastroc-soleus.
  - D. Promote single-limb support that is limited due to impaired sensation of the ankle and foot.
31. Which of the following impairments could lead to inadequate foot clearance during gait?
- A. Excessive activation of the plantarflexors
  - B. Impaired ankle proprioception
  - C. Reduced power of the hip flexors
  - D. All of the above

32. Which of the following would be the most effective intervention to promote foot clearance limited due to excessive activation of the quadriceps?
- A. Kinesiotape to the tibialis anterior muscle
  - B. Functional electrical stimulation to the plantarflexors
  - C. Part practice with rapid hip and knee flexion to a target
  - D. Unilateral stepping on a treadmill with uninvolved limb on the belt
33. In order to benefit from the neuroplastic principles of saliency and specificity, which of the following general interventions would be MOST appropriate for gait training after a stroke?
- A. Practice postural control while moving between sitting and standing
  - B. Provide an intensive strengthening program that can be done at home
  - C. Select a task that targets the impairment causing the gait abnormality
  - D. Walk over ground at a self-selected speed
34. If your hypothesis for the limitation identified by intake or observation involves limited flexibility at the ankle, which tests & measures are most appropriate?
- A. Coordination testing
  - B. Manual muscle testing
  - C. Range of motion measurement only
  - D. Range of motion and tone assessment
35. What type of feedback is most beneficial for a patient's motor learning in the long term?
- A. Bandwidth feedback, provided only when performance falls outside of normal
  - B. Continuous feedback, provided after every trial
  - C. Faded feedback, provided with higher frequency in the beginning and with less frequency in later stages of learning
  - D. Summary feedback, provided after a specified number of trials
36. How would "slow walking speed" be classified in the ICF model?
- A. Activity limitation
  - B. Body structure/function impairment
  - C. Health condition
  - D. Participation restriction
37. While performing the Romberg test, you note the person is able to stand with feet together with eyes open without difficulty, but when eyes are closed they lose their balance. What is the correct interpretation?
- A. Cerebellar impairment
  - B. Normal response, no impairment
  - C. Proprioceptive impairment
  - D. Visual impairment

38. Which person would have the BEST prognosis for recovery when in the acute 2-day post-stroke phase?
- A. Active 80-year-old male with diabetes and a large hemorrhagic medullary stroke.
  - B. Healthy 15-year-old female athlete with a small ischemic stroke in the PCA.
  - C. Inactive, obese 58-year-old male with a large ischemic stroke in the MCA.
  - D. Unresponsive premature infant (1 day old, weighing 2 pounds) with a large MCA hemorrhagic stroke
39. A person post-stroke reports during the history and intake portion of a neurologic exam that she has had problems falling forward while reaching to get dishes from the cabinet. Which of the following should be prioritized during the movement observation portion of the exam?
- A. Anticipatory postural adjustments in standing
  - B. Postural alignment in sitting and standing
  - C. Reactive postural adjustments in standing
  - D. Quiet sway in standing
40. The movement of sit to stand has 4 phases: flexion momentum, momentum transfer, extension, and stabilization. Which critical event is associated with the stabilization phase?
- A. Ankle strategy
  - B. Flexion at hips with continued ankle dorsiflexion
  - C. Foot placement 10 cm behind knees
  - D. Lower extremity extension
41. A person post-stroke has poor standing postural control related to reduced activation of the gluteus medius causing postural asymmetry. Which of the following interventions would address this diagnosis?
- A. Anterior-Posterior sways in standing, leaning into and away from a wall
  - B. Forced use by placing a small ball under the unaffected foot while standing
  - C. Repetitive sit to stand exercises
  - D. Sensory discrimination exercises for the affected foot while sitting (for safety)
42. Standing postural control is comprised of sensory, motor, and cognition. Which of the following would NOT be part of the sensory component of postural control?
- A. Ankle proprioception
  - B. Timing of muscle activity
  - C. Vestibular function
  - D. Vision (primary peripheral field)
43. Which of the following is a critical event for the *transport phase* of reach to grasp?
- A. Creation of slip grip force

- B. Dissociation of the arm and leg
  - C. Pre-shaping of the hand
  - D. Visual identification of the object
44. What diagnosis best describes a sudden onset of paralysis or numbness that resolves within 24 hours?
- A. Cerebrovascular Accident (CVA)
  - B. Intracerebral hemorrhage (ICH)
  - C. Reversible Ischemic Neurological Deficit (RIND)
  - D. Transient Ischemic Attack (TIA)
45. What is the consequence of losing momentum during the flexion momentum phase of sit to stand?
- A. Lack of balance in the momentum transfer stage and beginning extension phase
  - B. Lack of full extension and poor stability in the extension phase
  - C. Loss of balance in the stabilization phase especially in the backward direction
  - D. Need for increased extensor strength in the momentum transfer phase
46. What is the typical equilibrium reaction response during a seated right lateral reaching task?
- A. Elongation in the left side of the trunk
  - B. Elongation on the right side of the trunk
  - C. Maintenance of a neutral spine
  - D. Shortening on the right side of the trunk
47. Which of the following neuroplasticity principles suggests that training that drives a specific brain function can lead to an enhancement of that function?
- A. Repetition
  - B. Salience
  - C. Time
  - D. Use it and improve it
48. Which of the following neuroplasticity principles suggests that the nature of the training experience dictates the nature of plasticity?
- A. Intensity
  - B. Repetition
  - C. Salience
  - D. Specificity
49. What is the purpose of tossing different balls of unknown weights at a person while they are standing?

- A. Generate vestibular input for standing balance
- B. Induce an Anticipatory Postural Adjustment (APA) for standing balance
- C. Induce a Reactive Postural Adjustment (RPA) for standing balance
- D. Provide proprioceptive input for standing balance

50. What is the long-term neuroplasticity rationale for using an aerobic exercise primer before beginning a session with a person who is 3 weeks post-stroke?

- A. Aerobic exercise is fatiguing and impairs cognition and attention to motor skills
- B. Aerobic exercise prepares the cardiovascular system for increased exercise intensity
- C. Aerobic exercise releases BDNF to strengthen synaptic connections and dendritic growth
- D. Aerobic exercise warms the soft tissues in preparation for motor learning

AMU