

## MC questions Topics in Rehabilitation

1. A step counter (step detection based on inertial sensors) assesses mobility according to the aspects of
  - a. possible, quality
  - b. possible, quantity
  - c. performed, quality
  - \*d. performed, quantity
  
2. To assess walking ability of a patient according to the aspect of possible and quality you could use:
  - a. diaries
  - \*b. activity monitoring
  - c. video analysis
  - d. physiological markers
  
3. Which word is missing in the next sentence: "Rehabilitation medicine is aimed at the prevention, reduction and cure of (expected) ..... of chronic physical impairments or functional limitations?"
  - a. causes
  - \*b. consequences
  - c. cost
  - d. benefits
  
4. Which of the terms below does NOT describe a level of functioning as defined in the ICF classification?
  - a. body structure and function
  - b. participation
  - \*c. disease
  - d. activities
  
5. The concept relative aerobic load, as used by Wezenberg et al (2013) to analyse walking ability limitations in people with a lower limb amputation, can be defined as:
  - a. the oxygen uptake during walking divided by age
  - b. the oxygen uptake during walking divided by body mass
  - c. the oxygen uptake during walking divided by walking speed
  - \*d. the oxygen uptake during walking divided by maximal aerobic capacity
  
6. Which level of amputation has the highest incidence rate:
  - \*a. transtibial
  - b. knee ex-articulation
  - c. transfemoral
  - d. hemipelvectomy

7. Wezenberg et al (2013) assessed the relation between aerobic fitness and walking ability and predicted the effect of aerobic training on walking ability. What effect was predicted?
- a. increasing aerobic capacity could increase walking speed
  - b. increasing aerobic capacity could increase walking economy
  - c. increasing aerobic capacity could reduce relative aerobic load
  - \*d. increasing aerobic capacity could improve all of the above
8. Which minimal cardiorespiratory strain level is advised by the American College of Sports Medicine (ACSM) to achieve an aerobic training effect in people with chronic impairments, as used in the study of Koopman et al (2013) into the cardiorespiratory strain in clinical rehabilitation?
- a. 70% HRR, 20 minutes per day, 5 times per week
  - b. 30% HRR, 60 minutes per day, 3 times per week
  - \*c. 30% HRR, 20 minutes per day, 3 times per week
  - d. 70% HRR, 60 minutes per day, 5 times per week
9. The mechanical work for the step-to-step transition during walking with a lower limb prosthesis can be reduced through:
- a. Training the calf muscles of the intact leg.
  - \*b. Using an energy storing and return foot (ESAR).
  - c. Using a solid ankle cushioned heel foot (SACH).
  - d. training the aerobic capacity of the amputee.
10. How does relative metabolic load, while walking at self-selected comfortable walking speed, differ between people with a lower limb amputation and able-bodied controls:
- a. Relative metabolic load at self-selected walking speed is similar between amputees and able-bodied controls.
  - b. Relative metabolic load at self-selected walking speed is higher in amputees compared to able-bodied controls.
  - \*c. Relative metabolic load at self-selected walking speed is higher in vascular amputees but similar in traumatic amputees compared to able-bodied controls.
  - d. Relative metabolic load at self-selected walking speed is similar in vascular amputees but higher in traumatic amputees compared to able-bodied controls.
11. What potential benefit of step length asymmetry in people with a transtibial prosthesis did Hak et al (2014) detect in their study?
- a. step length asymmetry could enhance gait stability in medial direction (towards the prosthetic side).
  - b. step length asymmetry could enhance gait stability in lateral direction (towards the intact side).
  - \*c. step length asymmetry could enhance gait stability in backward direction.
  - d. step length asymmetry could enhance gait stability in forward direction.
12. Which impairment in people with a lower limb amputation is causally related to step length asymmetry and reduced margin of stability according to the model of Hak et al (2014)?
- a. reduced sensory information in the prosthetic leg.
  - b. increased fear of falling.
  - \*c. reduced push off power in the prosthetic ankle.
  - d. reduced walking speed.

13. In terms of injury severity, what is about the percentage of individuals with a spinal cord injury classified as an ASIA A?

- a. 20%
- \*b. 40%
- c. 60%
- d. 80%

14. Electrical stimulation-induced leg cycling exercise in individuals with spinal cord injury can have some benefits compared to arm exercise. What is NOT an important benefit of this exercise?

- a. A higher maximal stroke volume.
- \*b. A higher maximal heart rate.
- c. Improved capillarization in the legs.
- d. A higher oxygen consumption in the paralyzed leg muscles.

15. Individuals with tetraplegia are at a much higher risk of mortality from cardiovascular diseases compared with the general population. This is partly the result of

- \*a. Incidence of silent ischemia.
- b. Higher HDL-cholesterol levels.
- c. Higher blood pressure levels.
- d. A lower insulin resistance.

16. Individuals with a spinal cord injury have a higher risk of developing obesity. What factor does NOT contribute to this higher risk?

- a. A lower basal metabolic rate.
- b. A reduced muscle mass.
- \*c. A lower venous return.
- d. A lower activity level.

17. In the Allrisc study, training with arm cranking was compared with hybrid exercise training (arms and legs) in individuals with long-standing spinal cord injury. What were the main results?

- \*a. Both exercise forms reduced trunk and android fat.
- b. Hybrid exercise reduced waist circumference more than arm cranking.
- c. Only hybrid exercise reduced fat mass in the legs.
- d. Both exercise forms were unable to change inflammatory status.

18. Baldi et al. (1998) studied the effects of FES-exercise on lean body mass (muscle mass) in individuals with acute spinal cord injury (> 1 yr). What were the main results?

- a. FES-cycling reduced the loss in gluteal but not in leg muscle mass.
- b. FES-cycling reduced the loss in leg but not in gluteal muscle mass.
- c. FES-isometric exercise (no resistance) prevented the loss in gluteal muscle mass.
- \*d. FES-cycling exercise increased the total lean body mass.

19. Exoskeletons have been developed over the last 10 years to assist in walking in people with spinal cord injuries. What can be an advantage of these exoskeletons?

- a. Walking with an exoskeleton is faster than wheelchair propulsion.
- b. You can use your paralyzed leg muscles.
- \*c. A reduced height difference at social events.
- d. All of the answers above are correct.

20. Goosey-Tolfrey and Leicht (2013) discussed how wheelchair setup can affect performance. One of the parameters was wheel camber. What is an increased camber good for?

- a. It increases wheelchair speed.
- b. It reduces rolling resistance.
- \*c. It improves manoeuvrability.
- d. All of the answers above are correct.

21. When assessing the health and well being of fetuses researchers have to take into account the behavioural states. In fetuses the behavioural states are characterised by recurring conditions of three main variables in stable association with one another. Which variable is NOT included in this stable association?

- \*a. Breathing movements.
- b. Eye movements.
- c. General movements.
- d. Heart rate pattern.

22. When General Movements are observed during the first 24 weeks of gestation several aspects have to be assessed. Which aspect is the LEAST relevant to detect abnormal development of the fetus:

- a. Fluency of movement.
- \*b. Quantity of motor activity.
- c. Variation in amplitude of movement.
- d. Variation in speed of movement.

23. In typical normal development of an infant, derotative righting is:

- \*a. A postural reaction that gradually emerges after birth.
- b. A primary reflex that gradually disappears after birth.
- c. Initiated by stimulating both plantar soles of the infant.
- d. Initiated by holding the infant by the wrists.

24. According to the maturationist perspective, motor development is:

- a. Due to the amount of stimulation provided by the environment.
- b. Emerging from the interaction of several sub-systems.
- c. The result of the interplay between physical maturation and external constraints.
- \*d. The direct consequence of the maturation of the cerebral cortex.

25. In their article Lobo and Galloway (2012) present the results of a 3-week intervention in 2-month-old infants with a follow-up through 15 months of age. The intervention mainly consisted of postural stimulation provided by the parents. One of the main results of the study is that:

- a. Parents were as good as physical therapists to advance the development of their babies.
- b. The intervention advanced the communication abilities at the 15 months follow-up.
- c. The intervention advanced the visual search strategy of the infants.
- \*d. A home-based intervention can advance motor skills in infants.

26. The results of the study by Lobo and Galloway (2012) support the notion that:

- a. The effects of early intervention are limited to the trained fundamental motor skills.
- \*b. The effects of exercising fundamental motor skills have a positive cascading effect on further motor development.
- c. Training fundamental motor skills advances social and emotional development.
- d. Training fundamental motor skills limits the development of other domains (e.g., social and emotional).

27. According to Herskind et al. (2015) successful early intervention in children with cerebral palsy requires:

- a. To start the intervention as soon as the parents ask for it.
- \*b. To start even when there is only a suspicion of cerebral palsy.
- c. To be sure of the diagnosis before the intervention can start.
- d. To wait until the moment the type of cerebral palsy is recognised in order to adjust the intervention to the specific problems.

28. According to Herskind et al. (2015) a common weakness of assessments used for early detection of cerebral palsy is:

- a. That they do not discriminate between the different types of motor disorders.
- b. That they do not discriminate between the different levels of functioning.
- c. That they were validated in population with low prevalence of the disease.
- \*d. That they were validated in population with high prevalence of the disease.

29. The dystonic form of cerebral palsy is characterized by:

- a. Decreased activity and decreased muscle tone.
- \*b. Decreased activity and increased muscle tone.
- c. Increased activity and decreased muscle tone.
- d. Increased activity and increased muscle tone.

30. With the Gross Motor Function Measure a therapist can assess the motor function of a child with cerebral palsy (CP). Imagine: a therapist assesses a 6-year-old child with CP with the best and maximum score of 100. This means that:

- a. This child reached the maximum possible development of his gross motor function.
- b. This child will not need any further treatment since he is already at the maximum score.
- c. The motor function of this child belongs to the best when compared to typically developing 6-year-old children.
- \*d. The motor function of this child corresponds to what typically developing 5-year-old children can accomplish.

31. The movement disorder in cerebral palsy is clinically characterized as an upper motor neuron syndrome with positive and negative signs. One of the typical negative sign is:

- \*a. Weakness
- b. Spasticity
- c. Hyperreflexia
- d. Dyskinesia

32. Rosenbaum et al. (2002) calculated motor growth curves based on gross motor function measures in a large group of children with cerebral palsy. The results show that these curves allow prognostication about the later average motor level:

- a. According to the form of motor impairment (spastic, ataxic, etc...).
- b. By taking into account the best suited treatment for each gross motor score.
- \*c. For each level of the gross motor function classification system.
- d. Which is independent from the environmental factors such as parental encouragement.

33. In their article Richards and Malouin (2013) indicate that until recently, a major impediment to muscle strengthening in children with cerebral palsy was:

- a. That muscle weakness was not considered as a major problem.
- \*b. The belief that strength training increased spasticity.
- c. The lack of training protocols adapted for children.
- d. The lack of knowledge about muscle energetics in children.

34. In their study Kuhnke et al. (2008) investigated whether the effect of Constraint Induced Movement Therapy in children with unilateral cerebral palsy depended on the type of brain organization. According to the authors, a “hemispheric dissociation” could be one of the possible mechanisms that can explain their results. This “hemispheric dissociation” corresponds to:

- a. The disruption of the connections between S1 in the affected hemisphere and S1 in the non-affected hemisphere.
- b. The disruption of the connections between M1 in the affected hemisphere and M1 in the non-affected hemisphere.
- c. The organization of S1 in the non-affected hemisphere and preservation of M1 in the affected hemisphere.
- \*d. The organization of M1 in the non-affected hemisphere and preservation of S1 in the affected hemisphere.

35. In their article Kuhnke et al. (2008) distinguish two different brain organizations in children with cerebral palsy. One of this organization can be recognized based on the presence of active:

- \*a. Ipsilateral connections between contralesional hemisphere and affected hand.
- b. Ipsilesional connections between ipsilesional hemisphere and non-affected hand.
- c. Contralateral connections between contralesional hemisphere and non-affected hand.
- d. Contralesional connections between contralesional hemisphere and ipsilesional hemisphere.

36. Chinier et al. (2014) investigated motor imagery in individuals with left or right unilateral cerebral palsy (UCP) based on brain activation as measured with fMRI. Based on their results they conclude that at least a part of the individuals with UCP could benefit from a motor imagery training. What is the rationale followed by the authors?

- a. Individuals with a lesion in the left hemisphere show a disrupted network and therefore will NOT benefit from this specific training, because neuronal substrate is lacking.
- b. Individuals with a lesion in the right hemisphere show a disrupted network and therefore will NOT benefit from this specific training, because neuronal substrate is lacking.
- \*c. Individuals with a lesion in the left hemisphere show a disrupted network and therefore will benefit from this specific training that may (re)activate the neuronal substrate.
- d. Individuals with a lesion in the right hemisphere show a disrupted network and therefore will benefit from this specific training that may (re)activate the neuronal substrate.

37. Several criteria have to be met for the diagnose of Developmental Coordination Disorder according to the DSM-IV. Which criteria is assessed by product-oriented tests like the Movement-ABC?

- a. The level of attention.
- \*b. The execution of coordinated motor skills.
- c. The neurological condition (e.g., cerebral palsy).
- d. The impact of motor difficulties on activities of daily living.

38. The main aim of cognitive training in children with Developmental Coordination Disorder is:

- a. To enhance the capacity to inhibit impulsive movements.
- b. To enhance the motivation to attend numerous repetition of a task.
- c. To develop the information processing capacity.
- \*d. To develop the ability to solve motor problems.

39. The article by Wilson (2005) reviews the different assessment and treatment approaches for Developmental Coordination Disorder. What is a typical feature of a task specific treatment?

- \*a. Verbal self-guidance.
- b. Enhance sensory stimulation.
- c. Strength training.
- d. No guidance from the instructor.

40. Gait analysis in children with Developmental Coordination Disorder is described by Wilson (2005) as a relevant tool to assess motor coordination. The author describes this tool as a:

- a. Product-oriented assessment.
- \*b. Process-oriented assessment.
- c. Neuromaturational assessment.
- d. Neuromuscular assessment.

41. The similarities between a stroke patient with a visuo-spatial hemi-inattention and a patient with a visual (hemi)agnosia are:

- a. Both impairments are cognitive disturbances.
- b. Both impairments appear dominantly in the right hemisphere.
- c. Both disturbances always will result in problems in ADLs.
- \*d. All above-mentioned answers are true.

42. Which of these statement(s) is/are true?

- I. Homonymous hemianopia due to a stroke in the left hemisphere will result in a visual inattention to the right half of the visual field.
- II. Recovery of upper limb function after stroke is characterized by a proximo-distal sequence of motor control.

- a. Only statement I is true

- \*b. Both statements are true
- c. None of these statements are true
- d. Only statement II is true

43. Oligemia in the brain after a stroke is found if critical levels of regional Cerebral Blood Flow (rCBF) range between:

- a. 30 to 50 ml/100g/min
- \*b. 20 to 40 ml/100g/min
- c. 8 to 17 ml/100g/min
- d. All of the above levels

44. Upper motor neuron syndrome post stroke is characterized by:

- a. Hyper-reflexia
- b. Clonus
- c. Paresis
- \*d. All above-mentioned options

45. The consequences of an occlusion of a brain artery by an embolus in the brain is:

- I. Highly predictable by the known angiotecture of brain arteries.
- II. Highly unpredictable by the unknown angiotecture of brain arteries.
- III. Mostly caused by pulmonary problems such as pneumonia.
- IV. Mostly caused by cardiac impairments such as atrium fibrillation.

- a. Only statement I is true.
- b. Only statements I and III are true.
- c. Only statement II is true.
- \*d. Only statements II and IV are true.

46. Which of these statements is/are true regarding stroke?

- I. The increased rCBF seen in a fMRI scan is caused by a decreased oxyhemoglobin/ deoxyhemoglobin ratio.
- II. Cheyne-Stokes respiration is a typical phenomenon for an first-ever ischemic or hemorrhagic hemispheric stroke.

- a. Only statement 1 is true.
- b. Only statement 2 is true.
- c. Both statements are true.
- \*d. None of these statements are true.

47. Which of these statement(s) is/are true:

- I. Spontaneous neurological recovery after stroke is restricted to first 3 months post stroke.

II. Homeostatic neuroplasticity after stroke is mainly restricted to the first weeks post stroke.

- a. Only statement I is true
- b. Only statement II is true
- \*c. Both statements are true
- d. None of these statements are true

48. Exercise-induced brain plasticity post stroke is accompanied with:

- I. Increased levels of BDNF.
- II. Increased levels of IGF-type I.
- III. Increased levels of VEGF.
- IV. Reduced levels of NOGO factors.

- a. Only answer I is correct.
- b. Only answer II is correct.
- c. Only answers I, II, and III are correct.
- \*d. All mentioned answers are correct.

49. Spike-dependent neuroplasticity includes:

- \*a. Synaptic growth.
- b. Dendritic growth.
- c. Axonal growth.
- d. All answers are correct.

50. Upper limb robotics in stroke patients have shown to be effective in:

- I. Improving synergy-independent motor control.
- II. Improving upper limb activities.

- a. Only answer I is correct.
- b. Only answer II is correct.
- c. Both answers are correct.
- \*d. Both answers are incorrect.

51. Spasticity is defined as:

- I. A velocity dependent increase in joint resistance.
- II. A movement disorder after stroke.

- \*a. Only answer I is correct
- b. Only answer II is correct
- c. Both answers are correct
- d. Both answers are incorrect

52. Flexion synergies in stroke patients:

- I. Are noticeable shortly after stroke.
- II. Can be influenced by elimination of gravitational forces.

- a. Only answer I is correct
- b. Only answer II is correct
- \*c. Both answers are correct
- d. Both answers are incorrect

53. Which of the following statements regarding the diagnosis of Parkinson's Disease (PD) is/are true?

- \*a. The clinical diagnosis is based on the presence of bradykinesia and minimally one of the following: resting tremor, rigidity, postural instability.
- b. Brain imaging using MRI provides definite confirmation of the diagnosis of PD.
- c. The clinical diagnosis is based on the presence of rigidity and minimally one of the following: resting tremor, bradykinesia, postural instability.
- d. Brain imaging using SPECT provides definite confirmation of the diagnosis of PD.

54. Which of the following is a hypothesized mechanism behind postural instability and falls in PD?

- a. Patients never choose the same response, despite similar requirements for maintaining balance (e.g. ankle strategy/hip strategy).
- b. A reduced level of co-contraction is observed, causing an overly flexible posture that is easy to perturb.
- \*c. Patients have altered perception of stability limits, preventing appropriate action when the Centre of Pressure approaches the stability boundary.
- d. Levodopa actually causes falls because it increases dizziness.

55. All Parkinson patients in the Rescue trial (see also Nieuwboer et al., 2007) were assessed with standardized capacity tests in their own home as opposed to the outpatient clinic, for what reason?

- a. To increase the variability of the assessments.
- b. To optimize the performance by avoiding learning effects.
- c. To obtain insight in the patient's every day performance at home.
- \*d. Patients also received therapy in their own home situation.

56. Dimitrova et al. (2004) studied postural reactions to external stance perturbations in Parkinson's Disease patients by moving the support surface during standing, what did they demonstrate?

- a. PD patients show more tremor in the antagonist muscles of the left and right leg during a leftward sway perturbation compared to controls.
- b. PD patients show less co-contraction in the left and right legs during a rightward sway perturbation compared to controls.

- c. PD patients show less dis-coordination in the arm reaction during a leftward sway perturbation compared to controls.
- \*d. PD patients show pronounced co-contraction in antagonist muscles in the left leg during a leftward sway perturbation compared to controls.

57. In the study on the effects of Rhythmic Visual Cueing (see also van Wegen et al. 2006) in Parkinson's disease it was found that:

- a. Optic flow information during walking impairs the use of transverse stripes projected on the floor of a virtual corridor.
- b. Systematic manipulation of walking speed is crucial to study effects of cueing on rigidity and bradykinesia in Parkinson's disease.
- c. Trunk rotation is coupled in a fixed way to walking speed.
- \*d. A flashing light attached to glasses can be used to increase the stride length while maintaining walking speed.

58. The results of the RESCUE study (Nieuwboer et al. 2007) in cueing training in Parkinson's disease showed that:

- a. Balance performance as well as fear of falling increased after cueing training.
- b. At 6-week follow-up, training effects were sustained and almost no reduction in outcomes was seen.
- \*c. 'Uncued' walking performance after training with cues was improved.
- d. Quality of life was significantly improved after cueing training.

59. Freezing is a specific debilitation gait problem in patients with PD. Which of the following statements is true?

- a. Freezing is a continuously present gait problem, occurring mostly in open, unconfined spaces.
- b. Compared to freezers, non-freezers make larger turns with smaller and more variable steps due to postural instability.
- c. Freezing is an episodic gait problem, characterized by excessive lateral weight shifting.
- \*d. Freezing is thought to result from a disturbed interaction between step rhythm and amplitude.

60. Based on recent systematic reviews and RCT'S on the effects of exercise on mobility in Parkinson's disease (vd Kolk & King 2013), it can be concluded that exercise therapy can improve:

- a. Tremor, rigidity and fitness.
- \*b. Gait, functional mobility and balance.
- c. Rigidity, fatigue and mood.
- d. Balance, tremor and bradykinesia.