Nervous System Puzzle-Style Scenarios

Case 1: Delayed Reaction Time During Sprint Drills

- A physiotherapy student observes a sprinter's reaction to the starting signal is consistently slower than teammates, despite similar physical conditioning.
  Options:

  1. Analyze central processing speed and sensory-motor integration.
  2. Increase sprint repetitions immediately to force adaptation.
  3. Ignore and focus only on strength training.
     Reasoning:
     Option 1 considers the nervous system's role in motor response, allowing targeted drills (visual/auditory cue training). Option 2 may cause fatigue without solving neural delay. Option 3 neglects the neural component of performance.

Case 2: Post-Stroke Gait Asymmetry

- During a community rehab visit, you notice a stroke survivor dragging one foot despite good muscle strength.
  Options:

  1. Investigate proprioceptive deficits and motor cortex involvement.
  2. Add more resistance exercises to the weak limb.
  3. Focus on cardiovascular training alone.
     Reasoning:
     Option 1 targets neural control of movement patterns. Option 2 might help later but misses motor planning issue. Option 3 overlooks the primary goal of restoring gait symmetry.

Case 3: Tremor During Precision Task

- A student intern notices a client's hand shakes while writing, but not at rest.
  Options:

  1. Consider cerebellar involvement and fine-motor control exercises.
  2. Prescribe heavy hand strengthening exercises.
  3. Ignore since tremor is not painful.
     Reasoning:
     Option 1 addresses potential intention tremor due to neural coordination deficits. Option 2 risks worsening fatigue without improving control. Option 3 misses opportunity to improve function.

Case 4: Balance Loss with Eyes Closed

- During Romberg testing, a client sways significantly when eyes are closed.
  Options:

  1. Evaluate proprioceptive input and vestibular function.
  2. Focus solely on visual tracking drills.
  3. Ignore as "normal clumsiness."
     Reasoning:
     Option 1 recognizes multisensory integration in postural control. Option 2 only trains vision, not the root issue. Option 3 could lead to falls if problem persists.

Case 5: Delayed Reflex in Achilles Tendon Test

- While observing a sports physical, you notice a sluggish Achilles tendon reflex.
  Options:

  1. Consider possible peripheral nerve conduction delay.
  2. Recommend immediate strength training of calves.
  3. Ignore as "just individual variation."
     Reasoning:
     Option 1 uses physiological reasoning to check for neural pathway involvement.

Option 2 may strengthen muscle but does not address neural latency. Option 3 risks missing underlying neurological changes.

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Case 6: Slow Motor Learning in Skill Acquisition

A beginner tennis player takes longer to master a forehand despite repeated practice. **Options:**

1. Adjust practice to include variable feedback for motor learning.
2. Increase session duration without feedback.
3. Ignore and assume player is uncoordinated. **Reasoning:** Option 1 optimizes neural plasticity. Option 2 may lead to fatigue without learning. Option 3 demotivates the learner.

Case 7: Hyperreflexia After Spinal Cord Injury

A patient displays exaggerated knee-jerk reflexes months after injury. **Options:**

1. Explain loss of descending inhibitory control.
2. Recommend heavy resistance training.
3. Ignore since movement occurs. **Reasoning:** Option 1 educates on spinal circuitry changes. Option 2 could worsen spasticity. Option 3 neglects safety concerns.

Case 8: Difficulty with Dual-Task Walking

An elderly client slows significantly when asked to count backward while walking. **Options:**

1. Recognize cognitive-motor interference and train dual-tasking.

2. Focus only on strength training.
3. Ignore cognitive demands. **Reasoning:** Option 1 addresses neural resource allocation. Option 2 only addresses physical capacity. Option 3 risks falls in real-world scenarios.

Case 9: Paresthesia After Repetitive Typing

Intern complains of tingling in fingers after clinic note-taking. **Options:**

1. Consider median nerve compression and ergonomics.
2. Recommend ignoring until pain develops.
3. Prescribe wrist strengthening only. **Reasoning:** Option 1 focuses on early nerve health intervention. Option 2 risks chronic neuropathy. Option 3 misses primary cause.

Case 10: Startle Response During Therapy

A pediatric client shows exaggerated startle reflex during sessions. **Options:**

1. Modify environment to reduce sudden sensory input.
2. Continue loud cues to desensitize.
3. Ignore reaction. **Reasoning:** Option 1 supports nervous system adaptation safely. Option 2 may overwhelm. Option 3 undermines trust.

Case 11: Slow Nerve Conduction Post-Injury

Electrodiagnostic report shows delayed signal velocity. **Options:**

1. Adjust rehab expectations for remyelination timeline.
2. Push for maximal strengthening immediately.
3. Ignore findings. **Reasoning:** Option 1 respects neurophysiology. Option 2 may frustrate patient. Option 3 risks improper planning.

Case 12: Unilateral Neglect During Task

Stroke survivor eats food only on one side of plate. **Options:**

1. Provide visual scanning exercises.
2. Increase resistance training.
3. Ignore behavior. **Reasoning:** Option 1 targets parietal lobe function. Option 2 unrelated. Option 3 leaves safety issues unaddressed.

Case 13: Fatigue During Repetitive Contractions

A client's grip strength declines rapidly within seconds. **Options:**

1. Consider neuromuscular junction fatigue.
2. Prescribe longer sets.
3. Ignore. **Reasoning:** Option 1 supports correct diagnosis of neural fatigue. Option 2 may worsen fatigue. Option 3 neglects underlying physiology.

Case 14: Abnormal Plantar Reflex

Observation shows Babinski sign in adult. **Options:**

1. Flag for upper motor neuron involvement.
2. Ignore as "normal variant."
3. Prescribe calf strengthening. **Reasoning:** Option 1 uses neurophysiological insight. Option 2 unsafe. Option 3 unrelated.

Case 15: Lack of Motor Inhibition

Client cannot stop movement when asked. **Options:**

1. Evaluate basal ganglia circuits.
2. Push faster drills to force stop.
3. Ignore. **Reasoning:** Option 1 addresses neural control. Option 2 may cause unsafe outcomes. Option 3 neglects key findings.