

Functional neurology: A review

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Grok prompt

Read this paper by Tony Rosner and provide a four paragraph summary in clinical language appropriate for a Chiropractor and provide a 5 question, multi-choice quiz, identifying the correct answers.

Grok response

Summary

- Functional neurology positions the nervous system as the master biomarker of health, with brain and spinal networks whose tone and connectivity influence overall function. It emphasises that variations in neural signalling and plasticity underlie health and disease and that noninvasive tests can localise dysfunctional neural circuits and guide targeted stimulation or rehabilitation before overt pathology develops. This approach is grounded in neuroplasticity, recognising that experience, sensory input, emotion, and motor activity can reorganise neural connections to restore or bypass disrupted pathways, such as those seen after stroke or in cognitive decline.
- At the cellular level, the framework reviews fundamental neurophysiology relevant to clinicians: neurons integrate excitatory and inhibitory inputs to reach firing thresholds; neurotransmitters (including acetylcholine, GABA, NMDA receptors, and monoamines like dopamine and serotonin) modulate membrane potentials, synaptic transmission, and downstream gene expression. The discussion extends to how plasticity and neurogenesis (e.g., in the hippocampus) underlie learning, memory, and recovery after injury. Clinically, these mechanisms support the rationale for rehabilitative strategies that repeatedly activate specific circuits to induce beneficial remodelling.
- The article surveys a broad menu of interventions that may modulate neuroplasticity and neurogenesis, many of which intersect with chiropractic and musculoskeletal care. Rehabilitation modalities (eye-movement/OKS, balance and complex movement training, vestibular therapy, developmental-disorder rehabilitation, manual and cranial approaches, acupuncture, biofeedback, aromatherapy, and cognitive/imagery-based therapies) are framed as ways to drive brain adaptation through sensory and motor engagement, with evidence ranging from mechanistic studies to randomised trials. The central theme is that, when applied in a thoughtful, progressive sequence, these modalities can improve autonomic balance, cortical and subcortical function, and patients' functional outcomes.
- Diet, botanicals, exercise, and mind-body practices are presented as influential modifiers of neuroplasticity and brain health. Omega-3 fatty acids, antioxidants from polyphenols, curcumin, green tea catechins, resveratrol, and exercise-induced increases in BDNF and hippocampal volume are cited as examples of environmental and nutritional factors that may augment rehabilitation. For Chiropractors managing chronic musculoskeletal and neurocognitive conditions, the paper supports an integrative, lifestyle-oriented plan that integrates evidence-based neuromodulatory strategies with manual care, aiming to optimise neural tone, sensorimotor integration, and quality of life while acknowledging areas where further high-quality research is needed.

Grok quiz

Five questions, multiple choice

1. What is the central premise of functional neurology as described in the paper?

- A) The brain's development is fixed after early childhood.
- B) The nervous system operates independently of environmental input.
- C) Neuroplasticity allows targeted stimulation and rehabilitation to modify neural connections.
- D) All neurological healing is completed with pharmacotherapy alone.

Correct answer: C

2. Which of the following best summarises a key mechanistic target discussed for modulating neural function?

- A) Fixed receptor densities that do not change with experience
- B) Ion channel dynamics and neurotransmitter systems (e.g., NMDA, GABA, acetylcholine) that alter membrane potential and signalling
- C) The sole importance of cerebrospinal fluid dynamics
- D) The irreversibility of neuron loss after injury.

Correct answer: B

3. Which rehabilitation approaches are highlighted as ways to drive neuroplastic changes in functional neurology?

- A) Only pharmacologic agents
- B) Eye movement/tracking exercises, balance/complex movement training, vestibular rehab, manual therapy, acupuncture, biofeedback, cognitive/imagery work
- C) Strict bed rest and avoidance of movement
- D) Surgery as the only remodelling intervention.

Correct answer: B

4. The article notes that certain dietary components may enhance neuroplasticity. Which nutrient class is emphasised for supporting neuronal membranes and signalling?

- A) Saturated fats
- B) Omega-3 polyunsaturated fatty acids (3-PUFAs)
- C) Simple sugars
- D) Sodium-rich electrolytes

Correct answer: B

5. In the context of integrating functional neurology into practice, what is a practical implication for chiropractors?

- A) Neurological rehab should be avoided to prevent conflicts with manual therapy.
- B) A multidisciplinary, lifestyle-inclusive plan that includes sensorimotor rehabilitation, nutrition, and stress management may augment neuromuscular recovery.
- C) Only spinal manipulation is necessary for all neurological conditions.
- D) Brain-focused interventions are not relevant to musculoskeletal care.

Correct answer: B