



LETTER TO THE EDITOR

## On physical exercise in the article “Update on the neurophysiology of sexual behavior and reproductive risk in adolescents”

### Sobre el ejercicio físico en el artículo “Actualización sobre la neurofisiología de la conducta sexual y el riesgo reproductivo en adolescentes”

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Dear Editor,

The interesting article by Salgado *et al.*,<sup>(1)</sup> published in the *Revista Habanera de Ciencias Médicas*, offers a comprehensive review of the neurophysiology of sexual behaviour in adolescents, highlighting factors that influence decision-making and reproductive risk. Within this context, the purpose of this Letter to the Editor is to contribute to the discussion by addressing the impact of physical exercise on adolescents’ neurocognitive and emotional development, given its potential as a modulating factor in behavioural regulation and the prevention of impulsivity-related risks.

Neuroplasticity refers to the capacity of the nervous system to reorganise its structure, function, and connectivity in response to experience, learning, or injury. It involves cellular and molecular mechanisms that enable synaptic and cortical adaptation. This process is fundamental to development, memory, and functional recovery following neurological damage. Physical exercise is recognised for its ability to enhance neuroplasticity and optimise cognitive functions (e.g., memory, processing speed, attention) through well-established neurobiological mechanisms.<sup>(2,3,4,5)</sup> Moderate to vigorous aerobic activity, in particular, has been associated with increased release of brain-derived neurotrophic factor (BDNF), a protein essential to neuroplasticity, which promotes synaptogenesis, neurogenesis, and myelination.<sup>(6)</sup> These processes are especially relevant during adolescence, a developmental stage characterised by significant structural and functional brain reorganisation, during which the prefrontal cortex—crucial for behavioural self-regulation—is still undergoing maturation.<sup>(3,5)</sup>

From the perspective of behavioural regulation, physical activity also influences the brain’s reward and self-control systems. Several studies<sup>(2,4,5)</sup> have shown that regular exercise facilitates the activation of frontostriatal circuits, thereby supporting emotional regulation and reducing the likelihood of impulsive behaviours.<sup>(2,4,5)</sup> Other research indicates that physically active adolescents are less likely to experience mood disorders or to engage in risk behaviours, including those associated with sexuality and reproduction.<sup>(7,8)</sup>

From a preventive standpoint, physical exercise may be considered an effective strategy for reducing the incidence of impulsive behaviours by fostering an environment conducive to reflective decision-making.<sup>(5)</sup> Furthermore, the stress- and anxiety-reducing effects of physical activity contribute to greater psychological resilience during adolescence.<sup>(2,8)</sup>

Some of the main effects of physical exercise on nervous system mechanisms related to behavioural and cognitive regulation in adolescence are summarised in Table 1.



**Table 1. Effects of Physical Exercise on Nervous System Mechanisms or Processes Related to Behavioural and Cognitive Regulation During Adolescence\***

Mechanism or Process in the Nervous System	Observed or Attributed Effect	Source
Neuroplasticity and neurogenesis	Exercise stimulates the formation of new neuronal connections and neurogenesis, aiding adaptation.	(2,3)
BDNF release	BDNF supports neuronal survival and differentiation, facilitating synaptic plasticity.	(6)
Stress and anxiety regulation	Physical exercise reduces cortisol levels and increases endorphin release, promoting emotional well-being.	(2,8)
Improved impulse control	Physical activity enhances prefrontal cortex function, increasing self-regulation and reducing impulsivity.	(5)
Strengthening of frontostriatal circuits	Exercise supports integration of information between the prefrontal cortex and striatum, improving decision-making.	(2,4)
Reduction in impulsive behaviours	Regular physical activity lowers the predisposition to impulsive behaviours, including risk behaviours in adolescence.	(7)
Promotion of psychological resilience	Exercise serves as a resilience factor by enhancing emotional regulation and reducing symptoms of depression and anxiety.	(3,8)
Enhancement of learning and memory	Increased BDNF and neural stimulation improve memory consolidation and learning capacity.	(6,4)

**\*Note.** This table summarises the principal neurobiological processes activated by regular physical exercise and their effects on neuroplasticity, executive function, emotional regulation, and decision-making in adolescents. The supporting evidence is derived from studies involving neuroimaging, biomarkers, and cognitive assessments reported in the literature analysed.<sup>(2,8)</sup>

**BDNF:** brain-derived neurotrophic factor.

In light of the increasing body of evidence regarding the mental and neurocognitive benefits of physical exercise in adolescents, it is appropriate to consider the more explicit inclusion of its promotion within public health strategies. The implementation of programmes that encourage physical activity within school settings could play a meaningful role in reducing risk factors associated with impulsivity and sexual behaviour not based on informed, responsible, and autonomous decision-making.<sup>(3,5)</sup> The article by Salgado *et al.*<sup>(1)</sup> provides a useful contribution to the broader discussion on the neurophysiology of adolescent sexual behaviour. The incorporation of a neurobiological perspective concerning physical exercise may further enrich this discussion, offering a more integrated approach to the prevention of risk behaviours among teenagers. Physical exercise should not be regarded solely as a physiological or behavioural measure, but as part of a comprehensive framework—an integrative perspective consistent with healthy human development and growth.<sup>(9)</sup>

The author appreciates the opportunity to contribute to this debate and hopes that these reflections will complement the analysis presented in the original article.<sup>(1)</sup>

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**Conflict of Interest**

The author declares no conflict of interest.