Eco-Neuro-Rehabilitation Interventions to Alleviate and Strengthen Prefrontal Control During Toxic Stress

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Abstract:

In today's fast-changing world, children face increasing stress, threatening their mental, physical, and neurological health. Early development of resilience and adaptability is crucial to counteracting these negative effects.

Supportive environments are crucial for improving the regulatory functions of the prefrontal cortex (PFC), which governs emotions, thoughts, and behaviors. This regulation is key to promoting resilience and overall well-being. Adverse Childhood Experiences (ACEs), such as war, abuse, or household instability, can lead to toxic stress that overwhelms the PFC, activating primitive brain circuits and potentially resulting in neurological disorders and behaviors like impulsivity and aggression. These experiences affect the mind, body, and soul, significantly impacting emotional well-being and overall behavior.

We propose an intervention model designed to strengthen PFC control from the top down, aiding children in managing trauma. The interventions target the mind, body, and soul, corresponding to specific brain regions. Activities such as nature walks, mindfulness, nutrition therapy, neurofeedback, and brain games enhance PFC function, representing the mind. Meanwhile, deep breathing exercises and quality sleep regulate the brainstem, representing the body. To support the emotional limbic system, symbolizing the soul, creative activities, psychotherapy, and music therapy are recommended. These strategies aim to improve resilience and enhance brain connectivity.

Keywords:

Childhood stress, Resilience, Prefrontal cortex (PFC), Toxic stress, Intervention model.