

# EXPLORING FACTORS AND INTERVENTION STRATEGIES FOR EATING DISORDERS IN DANCERS : A GUT-BRAIN AXIS PERSPECTIVE

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## Summary

**Background:** The incidence of eating disorders in dancers represents a complex health issue. Traditional research frameworks have failed to sufficiently elucidate this matter. Emerging theories on the gut-brain axis provide a potentially transformative perspective for understanding these disorders in dancers. **Purpose:** This review aims to explore the factors influencing eating disorders in dancers and to propose novel intervention strategies that integrate gut-brain axis theory with established multidimensional approaches. **Methods:** This systematic review explores the relationship between eating disorders and the gut-brain axis theory in dancers from 2013 to 2023, analyzing 10 out of 200 articles and comparing conventional frameworks with insights from the gut-brain axis. Comparing conventional frameworks with gut-brain axis insights. It evaluates how gut microbiota affects eating behaviors and discusses possible interventions. **Results:** The research indicates that the gut-brain axis provides a new framework for understanding eating disorders in dancers, addressing limitations of conventional approaches. Multiple studies reveal a significant link between gut microbiota diversity and eating disorder symptoms, implying that gut microbiota may affect the relationship between stress and eating behaviors. Accordingly, this paper outlines innovative intervention strategies, including microbiome management, integrated stress reduction, and customized dietary plans. Preliminary findings suggest that these strategies, based on gut-brain axis theory, may effectively alleviate eating disorder symptoms in dancers, highlighted by the potential benefits of probiotic supplementation. **Conclusion:** This review presents a comprehensive theoretical framework for understanding and addressing eating disorders in dancers. It draws focus to the critical need for ongoing research regarding the interaction between gut microbiota and the nutritional behaviors of dancers, alongside scrutinizing the enduring effects of these pioneering treatments. Overall, the gut-brain axis perspective opens new avenues for research on eating disorders in dancers, promising to enhance the development of more effective prevention and treatment strategies.

**Keywords:** Eating Disorders, Gut-Brain Axis, Body Image, Stress Management, Nutritional Interventions.

## INTRODUCTION

The incidence of eating disorders among dancers has repeatedly emerged as a vital topic of inquiry within the realms of dance medicine and psychological examination. Current investigations reveal that the rate of eating disorders among this cohort is exceptionally pronounced, with forecasts proposing that nearly 40% of female dancers might undergo some variety of disordered eating practices (Ravaldi et al., 2023). In juxtaposition with the frequency of eating disorders among other athletic groups, which is relatively lower, typically falls within the range of 20% to 30% (Gvion et al., 2023). For a considerable period, scholars have scrutinized the origins of this issue from diverse perspectives, incorporating physiological, psychological, and

sociocultural dimensions. However, recent advancements in neuroscience and microbiology have unveiled the gut-brain axis theory, which presents an innovative framework for a thorough comprehension of the complex mechanisms that underlie the prevalence of eating disorders in dancers. This manuscript aspires to amalgamate conventional multidimensional analyses with the burgeoning gut-brain axis framework to explore the fundamental causes of eating disorders in dancers and to propose groundbreaking intervention strategies informed by this comprehensive approach.

## RESEARCH METHODS

This study utilizes a systematic literature review to examine the relationship between eating disorders and the gut-brain axis theory in

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dancers from 2013 to 2023. Relevant literature was meticulously gathered from academic databases such as PubMed, Google Scholar, Web of Science, Scopus, and JSTOR PubMed using targeted keywords, resulting in 200 scholarly articles. After eliminating duplicates and irrelevant studies, a refined set of 10 articles was selected for detailed examination. The research focused on traditional multidimensional frameworks concerning eating disorders, alongside insights from the gut-brain axis. The study compared results from various investigations to analyze how gut microbiota and endocrine systems influence eating behaviors, proposing specific intervention strategies based on these insights.

## **RESULTS AND DISCUSSION**

### **1. Factors of Dancers' Eating Disorders**

#### *Traditional Multidimensional Analysis*

The etiology of eating disorders in dancers is complex and multifactorial, involving intricate interactions among physiological, psychological, social, and environmental factors. Physiologically, elite dancers often face energy deficits, increasing eating disorder risks (Brown et al., 2017) and associated with menstrual dysfunction and reduced bone density (Joaquin et al., 2022). Patients frequently exhibit hormonal imbalances, such as elevated cortisol and decreased leptin, with changes in TSH and ACTH occurring before symptom onset (Schorr et al., 2020). Psychologically, perfectionism strongly correlates with eating disorder symptoms (Penniment and Egan, 2012), particularly maladaptive perfectionism. Intense training exacerbates body dissatisfaction (Swami and Sunshine, 2012). Socially, competitive stress positively correlates with eating disorder symptoms (Nordin-Bates et al., 2016), with ballet dancers more prone to eating disorders than modern dancers (Ravaldi et al., 2006). Research emphasizes the need for culturally sensitive prevention strategies.

#### *The Innovation and Insight of the Gut-Brain Axis Perspective*

The gut-brain axis in dancers' eating disorders involves intricate neural, endocrine, immune, and metabolic interactions. Gut

microbiota influence brain appetite regulation and emotional processing via the vagus nerve. They also impact hormone secretion related to appetite and metabolism, with their immune interactions potentially causing mild inflammation. The functionality of the blood-brain barrier and neuroprotection heavily relies on microbial metabolites (Silva et al., 2020). Regulating the stress response and hormone release is greatly impacted by the gut-brain axis). Additionally, gut microbiota affects nutrient absorption and energy metabolism. The rigorous training, dietary limitations, and competitive environment faced by dancers can disrupt gut-brain axis functioning, resulting in appetite irregularities, emotional instability, and metabolic imbalances, thus heightening the susceptibility to eating disorders. Investigating these mechanisms yields innovative pathways for developing gut-brain axis-oriented prevention and treatment approaches, such as modifying gut microbiota composition to affect dancers' emotional states, appetite, and energy equilibrium (Mack et al., 2023). Monteleone et al. (2018) emphasize the essential role of the bidirectional communication between gut microbiota and the central nervous system in influencing eating behaviors. This communication encompasses various pathways, providing a novel perspective on the intricate pathophysiology of dancers' eating disorders, surpassing conventional models.

### **2. Intervention Strategies Informed by Gut-Brain Axis Theory**

Leveraging empirical evidence from the gut-brain axis hypothesis, we propose the following novel intervention strategies for the prevention and treatment of eating disorders among dancers: (1) Microbiome Intervention: Formulate high-fiber, prebiotic-laden diets to enhance advantageous gut microbiota (Mack et al., 2023) and furnish targeted probiotic supplements for individuals at elevated risk; (2) Integrated Stress Management: Devise comprehensive methodologies encompassing mindfulness meditation and biofeedback modalities to regulate stress and enhance gut-brain interactions; (3) Personalized Nutrition

Plans: Construct tailored plans predicated on gut microbiome evaluations, incorporating regular reviews and modifications; (4) Education and Psychological Support: Create initiatives for dancers, coaches, and guardians to elucidate the implications of the gut-brain nexus on dietary behaviors; (5) Environmental Intervention: Reorganize training and performance settings to mitigate external stressors, taking into account diminished mirror utilization and cultivating a health-centric dance culture; and (6) Interdisciplinary Collaboration: Formulate teams of specialists in dance medicine, nutrition, psychology, and microbiology for comprehensive health management. These gut-brain axis-oriented interventions aspire to holistically and individually avert and address eating disorders in dancers whilst fostering overall health and performance efficacy.

## CONCLUSION

The gut-brain axis framework provides a novel perspective for understanding and treating eating disorders in dancers. This approach overcomes limitations of traditional models and supports tailored prevention and intervention strategies. Future studies should examine how the gut microbiome relates to the nutritional choices and psychological health of dancers, while also assessing the long-term impact of gut-brain axis-oriented strategies. Additionally, recognizing cultural differences in implementing these strategies is essential for their effectiveness across various cultures. By integrating established theories with insights from the gut-brain axis, we aim to address the complex issue of eating disorders in dancers more effectively.

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(Received 4/9/2024, Reviewed 12/11/2024, Accepted 28/11/2024)

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