

The Relationship Between Training, Body Composition, and Diet in Artistic Athletes

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INTRODUCTION

Collegiate dancers engage in artistic movement that is both physically demanding as well as aesthetically coordinated (1). Training includes extended hours for technique classes, rehearsals, and performances on top of rigorous academic schedules and additional stressors. As a result, nutrition becomes vital to sustain energy levels, muscle mass, performance and recovery (1). Despite its importance, few studies have focused on training loads and nutritional habits for artistic athletes, and even less have examined collegiate settings. While some research has been conducted, a more thorough (and larger) assessment of collegiate dancers' semester training loads and nutritional habits provides insight into the current setting and helps identify areas of concern to further investigate and target (2).

PURPOSE

To evaluate the relationship between semester training loads, body composition, and dietary profiles in female collegiate dancers in three dance programs throughout the United States.

METHODS

Thirty-six female collegiate dancers (20.4 ± 1 yrs; 165.8 ± 11.6 cm; BMI 21.3 ± 3.4 kg/m²) participated in the cross sectionally designed T.I.A.A.R.A. (The Intercollegiate Artistic Athlete Research Assessment) Study.

- We assessed:
 - Weekly dance training and semester coursework loads (n=36)
 - Anthropometrics (n=36)
 - Body composition (InBody 270) (n=32)
 - Self-reported habitual dietary intake (NIH DHQ III) (n=31)
- Statistical Approach:
 - Descriptive (means ± SD) & frequency
 - One-tailed Pearson correlations (r) were computed for skeletal muscle mass and dietary intake variables (p<0.05).

RESULTS

- **Nutritional Assessment (Figure 1)**
 - Most dancers were consuming a low-calorie diet (1399±491kcal)
 - ~20% of dancers were consuming a very low-calorie diet ≤1000kcal daily
 - 2 dancers were consuming <500 kcal/day
 - When compared to current sport nutrition recommendations, Dancers were under consuming:
 - Total Calories
 - Protein (Figure 2): 54.3±26.5 g
 - Fat: 55.5 ± 26.8 g
 - Carbohydrate: 171.8±77.8 g

FIGURE 1: TIAARA Dancers Consumed Low-Calorie & Low Macronutrient Diets

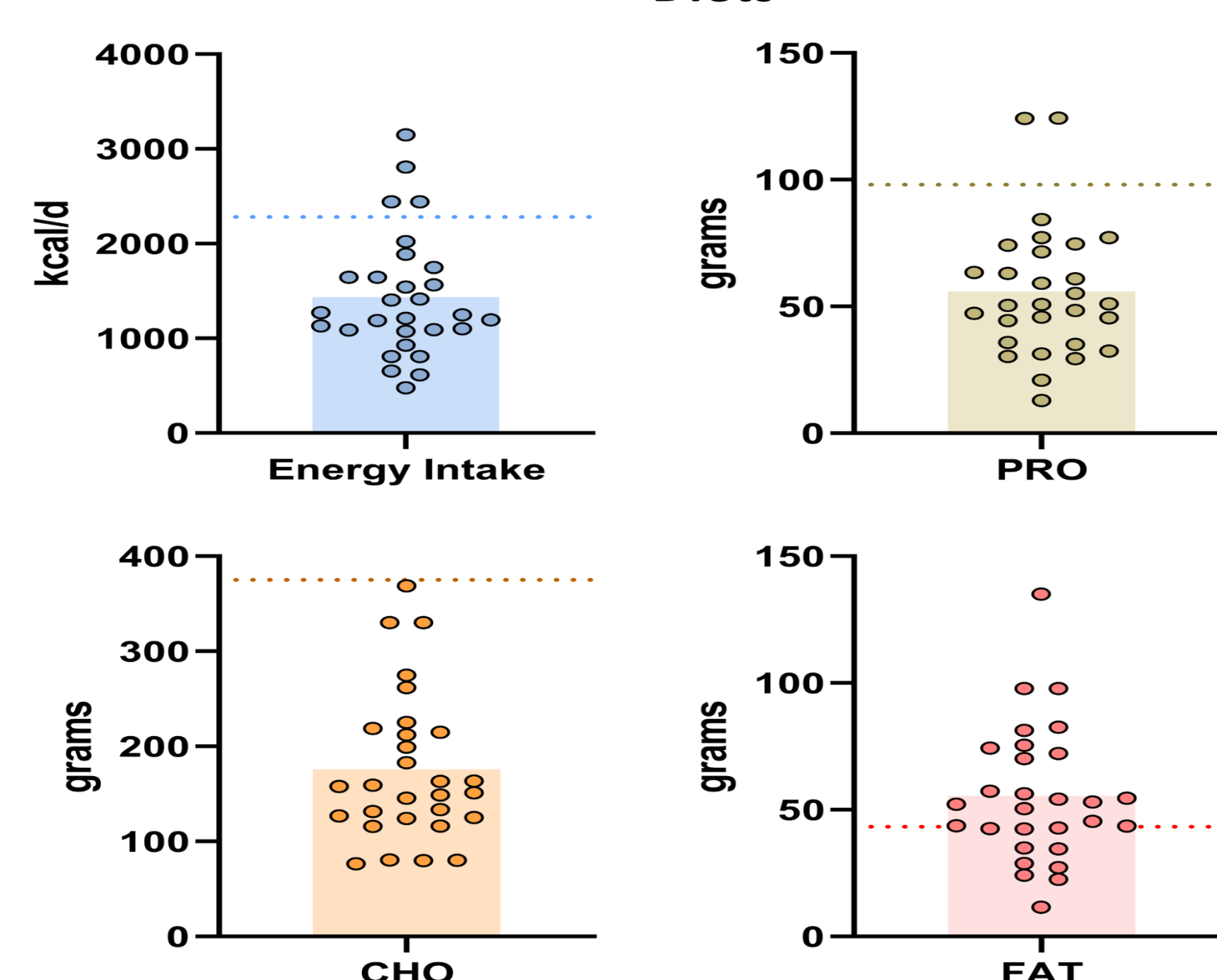


Figure 1: TIAARA Dancers Consumed Low-Calorie & Low Macronutrient Diets. Compared to sport nutrition recommendations, dancers reported under consuming total energy, dietary protein, fat, and carbohydrate. The dotted lines indicate current recommendations where the individual circles represent dancers' reported intake levels

FIGURE 2: TIAARA Dietary Protein intake (Left) vs Current Dance-specific Sport Nutrition Recommendations for Protein intake (1) (Right)



- **Dance & Training time**
 - Collegiate dancers were enrolled in an average of 16±2.09 semester credits
 - 7.7±3.8 credits as dance coursework.
 - Dancers reported additional
 - Dance rehearsal time each week (3.0±1.3 days/week)
- **Body Composition (Table 1)**
 - Skeletal Muscle Mass (kg): 24.7 + 3.7
 - Fat Mass (%): 24.8±6.6
 - Total body water (L): 32.8±4.5

Table 1: Participant Body Composition

Variables (n = 36)	Mean ± SD
Skeletal Muscle Mass (kg)	24.7 ± 3.7
Fat Mass (%)	24.8 ± 6.6
Total Body Water (L)	32.8 ± 4.5

Table 1: TIAARA Body Composition: Skeletal muscle mass (kg), Fat mass (%), and Total Body Water (L) were assessed via the InBody 270

- **Relationship between Muscle Mass & Diet**
 - Skeletal muscle mass (kg) was found to have:
 - A weak but significant correlation to total energy intake (r=0.38, p=0.03)
 - A moderate and significant correlation to dietary protein intake (r=0.41, p=0.02)
 - A moderate and significant correlation to leucine level intake (r=0.43, p=0.02)

CONCLUSIONS

Despite high energy and performance demands, collegiate female dancers were under consuming total calories and were below current sport nutrition recommendations for all macronutrients, particular dietary protein (3). Further analyses demonstrated a positive relationship between skeletal muscle mass, total energy intake, total PRO intake, and the essential amino acid, leucine. This further highlights the importance of food quantity and quality to support body composition.

PRACTICAL APPLICATIONS

The primary purpose of this study was to better understand how collegiate dance schedules and stressors relate to tenets of the athlete paradigm, such as energy intake, macronutrient content, and body composition. These results call to attention the importance of addressing performance nutrition with collegiate dancers and the benefit of highlighting essential nutrients needed for performance and recovery such as total calories, dietary protein, and nutrient quality. They also emphasize the need for more specific analyses, such as targeted metabolic testing, to close the gap between food frequency questionnaires and much needed energy expenditure assessments in the performing arts.

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