



The Intercollegiate Artistic Athlete Research Assessment (TIAARA)

Study: Evaluation of Lower Body Asymmetry in College Dance Majors

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Introduction

Dance requires an athlete to participate in high volumes of sport specific training that includes technique class, choreography rehearsal, and performance. College dance majors may take 12 hours of technique class per week and have rehearsal daily at various parts of the semester. Despite these demands, collegiate dancers have minimal access to strength and conditioning resources. As such, dancers may be prone to developing asymmetries as non-dominant sides may be neglected during training and not incorporated into choreography.

Purpose

To assess variables of lower body power during a typical countermovement vertical jump and a dance specific vertical jump, in order to evaluate the presence of asymmetries.

Methodology

Six collegiate dancers (20 ± 1.67 years; 165.7 ± 5.14 cm; 59.1 ± 6.92 kg; 44.5 ± 4.27 kg LBM; 24.40 ± 2.51 kg SMM) were recruited from Loyola University Chicago, as part of “The Intercollegiate Artistic Athlete Research Assessment (TIAARA)” study. Jump height, rate of force development (RFD), peak power (PP), and relative peak power (RPP) were evaluated using dual force plates from the performance of a typical countermovement vertical jump (CMJ) and a dance specific vertical jump (DSJ) test. Percent difference (%diff) was calculated between limbs to describe the degree of asymmetry. Paired-samples T test were used to determine between limb differences, while Pearson product correlations were used to investigate the relationship between body composition and %diff of CMJ and DSJ variables. Statistical significance was set at p < 0.05.

	Left Leg	Right Leg	Percent Difference
RPP DSJ (W/kg)	18.9 ± 3.02	19.8 ± 3.83	5.4 ± 2.50
RPP CMJ (W/kg)	19.0 ± 3.23	19.8 ± 3.21	4.4 ± 2.50*
Max RFD DSJ (Ns)	4868.9 ± 1609.99	4957.3 ± 1796.05	17.5 ± 12.98
Max RFD CMJ (Ns)	5492.9 ± 3201.08	4777.9 ± 2164.57	18.4 ± 19.34
PP DSJ (W)	1118.2 ± 244.01	1172.3 ± 290.15	5.4 ± 2.50
PP CMJ (W)	1120.9 ± 255.26	1170.6 ± 256.86	4.4 ± 2.50*

Table 1 Interlimb Jump Characteristics: Peak Power (PP), Relative Peak Power (RPP), Rate of Force Development (RFD), Counter Movement Jump (CMJ), Dance Specific Jump (DMJ). Significant difference (p<0.05) between limbs.

Results

Percent difference for RFD (DSJ, 17.45 ± 13.0 N/s; CMJ, 18.4 ± 19.3 N/s), PP (DSJ, 5.4 ± 2.5 W; CMJ, 4.4 ± 2.5 W), and RPP (DSJ, 5.4 ± 2.5 W/kg; CMJ, 4.4 ± 2.5 W/kg) were observed. Significant differences were found between limbs in PP (t= -4.610, p < 0.05) and RPP (t= -4.815, p < 0.05) for CMJ, while trends were observed in PP (t= -2.303, p = 0.07) and RPP (t= -2.314, p = 0.07) for DSJ. Strong correlations were found between lean body mass (LBM) and DSJ RFD %diff (r = .866, p = 0.026) and skeletal muscle mass (SMM) and DSJ RFD %diff (r = .860, p = 0.028). No other significant correlations were found.

Conclusion

Interestingly, greater LBM and SMM were found to lead to a greater degree of asymmetry for RFD in this cohort. This suggests a specific adaptation to imposed demands that favors force development of the preferred jumping leg. Further, significant differences found between limbs in PP and RPP support an imbalance of training adaptations in college dancers.

Practical Application

Assessment for asymmetry is a useful tool for athletic development, which can be used to address training discrepancies as asymmetries may increase risk of injury. Artistic directors and other support staff may find the incorporation of single leg strength training beneficial in order to minimize the effects of lower body asymmetry in dancers and other artistic-athletes. Further, reduction of asymmetry in dancers may enhance their ability to perform movements using their ‘off’ side. This may enhance one’s odds of being recruited to a company or selected for a performance, as they can perform more aspects of a choreographers repertoire.